



TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

FLOODS
OF
SEPTEMBER-OCTOBER 1964
IN THE UPPER
FRENCH BROAD
LITTLE TENNESSEE
AND
HIWASSEE RIVER BASINS

REPORT NO. 1000

KNOXVILLE, TENNESSEE

JUNE 1965

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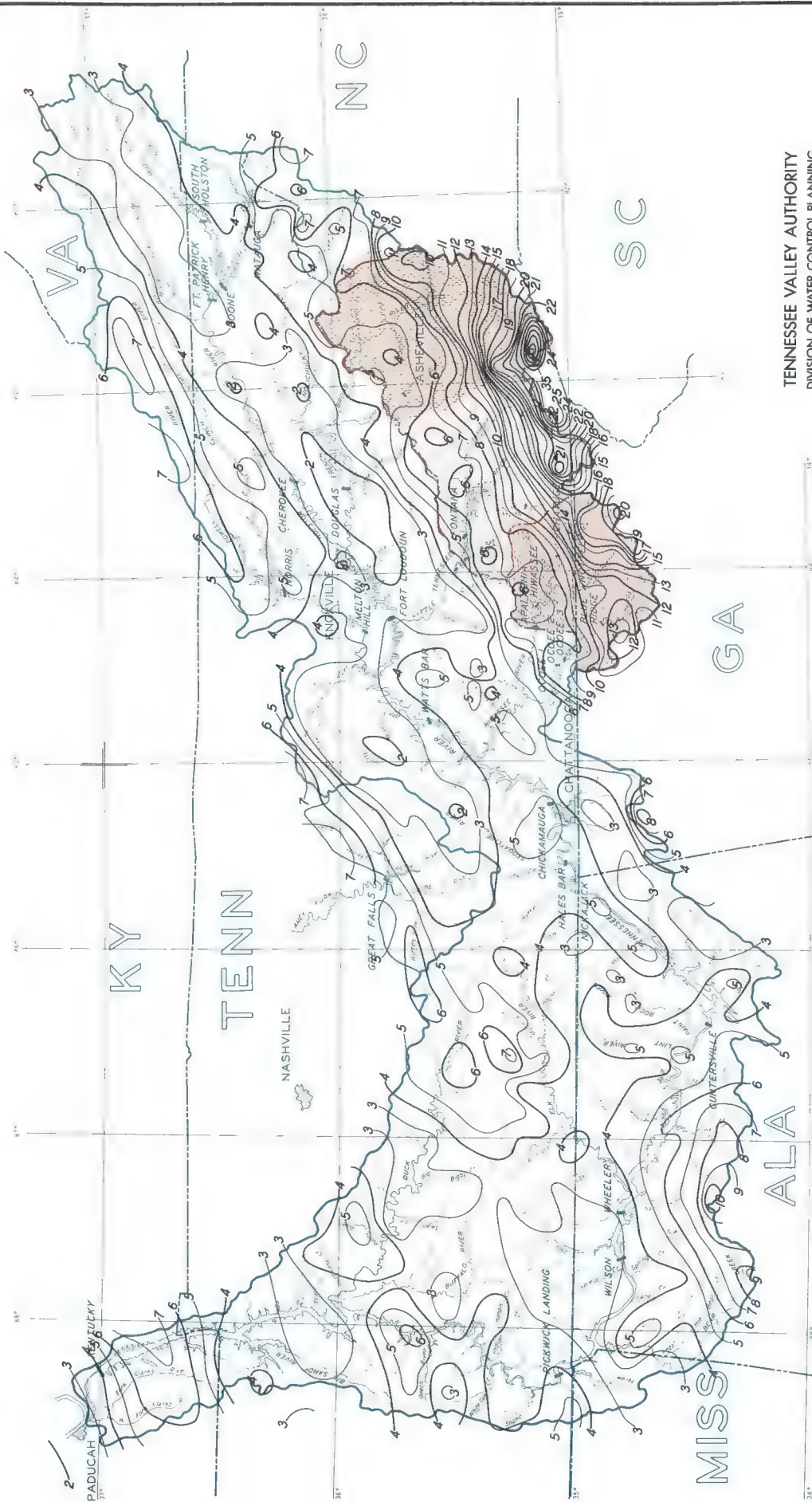
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HIGHLIGHTS

1. Two storms in the 8-day period from September 28 to October 5, 1964, resulted in floods on streams in the eastern portion of the Tennessee River Basin in the headwaters of the French Broad, Little Tennessee, and Hiwassee Rivers.
2. Heaviest rainfall during both storms occurred in a narrow band along the crest of the Blue Ridge in western North Carolina and northern Georgia.
3. A new rainfall record for the Tennessee River Basin was established when the station at Rosman, North Carolina, located in the French Broad River watershed, reported 17.24 inches of rain during the first storm from September 28 to 30, and 17.53 inches during the second storm on October 4 and 5. The total rainfall at Rosman during the period September 28 to October 5 was 35.38 inches.
4. Average rainfall for September 28 - October 5 over the French Broad River watershed above Asheville was 15.1 inches, over the Little Tennessee River watershed above Franklin was 18.3 inches, and over the Hiwassee River watershed above Chatuge Dam was 15.9 inches. In all three watersheds the rainfall was about equally divided between the two storms.
5. Floods resulting from the first storm were generally limited to the upper French Broad River basin. Above Asheville the river and some of its tributaries reached the highest stage since August 1940. Although rainfall amounts were similar during the two storms, runoff conditions were better during the second storm, and floods in the upper French Broad River basin were the highest since 1916 on most streams. On the upper Little Tennessee River the flood exceeded the highest previously known flood, but on its tributaries the flood was not so large as that in 1940 or 1949. In the Hiwassee River basin the October flood was the highest since 1952 on most streams, but on Brasstown Creek it was higher than any previously known flood.
6. Flood damages totaled an estimated \$2,739,000, with damages in the French Broad, Little Tennessee, and Hiwassee basins of \$1,805,000, \$816,000, and \$118,000, respectively. Of the total, 51 percent of the damage was listed as industrial and commercial; 19 percent as municipal, utility, highway, and railroad; 25 percent as agricultural, and only 5 percent as residential.



Upper French Broad River basin. Refer to Plates 1 and 3 for large scale isohyetal maps of the storms of September 28-30 and October 4-5, 1964, respectively.

Upper Little Tennessee River basin. Refer to Plates 4 and 6 for large scale isohyetal maps of the storms of September 28-30 and October 4-5, 1964, respectively.

Upper Tennessee River basin. Refer to Plates 7 and 9 for large scale isohyetal maps of the storms of September 28-30 and October 4-5, 1964, respectively.

SYMBOLS:

- Rainfall in Inches
- State Lines
- Dams
- Dams Under Construction

TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

TENNESSEE RIVER BASIN

STORMS OF SEPT 28-OCT 6, 1964



FLOODS OF SEPTEMBER-OCTOBER 1964

IN THE UPPER

FRENCH BROAD, LITTLE TENNESSEE, AND HIWASSEE RIVER BASINS

INTRODUCTION

Two floods in an eight-day period in late September and early October 1964 caused extensive damages in the upper portions of the French Broad, Little Tennessee, and Hiwassee River basins in the southeastern section of the Tennessee Valley. The first storm, on September 28-30, caused only moderate overflow in the Little Tennessee and Hiwassee River basins, but produced a flood in the extreme headwaters of the French Broad River which approached the record flood of July 1916. The second storm, on October 4-5, caused serious flooding in each of the three river basins, with peak stages exceeding any previously known at a number of points.

Total damages are estimated at \$1,805,000 for the French Broad River basin, \$816,000 for the Little Tennessee River basin, and \$118,000 for the Hiwassee River basin. Total damages in the three watersheds were estimated at \$2,739,000. Truck crops and commercial flowers, which are taking an increasing importance in the agricultural development of the upper French Broad River basin, had been largely gathered and harvesting of the regular farm crops was well advanced when the floods hit. Had the floods occurred a few weeks earlier, the loss to agricultural interests would have been much greater.

The Watersheds

The upper portions of the French Broad, Little Tennessee, and Hiwassee River watersheds in the Tennessee Valley lie within the Blue Ridge province of the Southern Appalachian Region. The Blue Ridge Divide forms the southern and eastern boundaries of these watersheds. Elevations along the Divide range generally from 2,000 to 4,500 feet above mean sea level and the drainage areas within the watersheds contain high mountain ranges, isolated peaks, and large rolling upland valleys. The Pinnacle, the highest mountain along the divide, rises to a height of 5,665 feet in the upper French Broad basin. At Asheville, 18 miles southwest of The Pinnacle, the elevation of the valley floor of the French Broad River is

about 2,000 feet. Mountain peaks in the Great Smokies on the northern border of the upper Little Tennessee basin range up to 6,642 feet at Clingmans Dome. The valley floors of the major streams in these watersheds lie from about 1,000 to 4,500 feet below the crests of their surrounding highlands.

The topographic situation has a marked influence upon the rainfall over these watersheds. The wide ranges in elevation within short distances are reflected in similar variations in rainfall. For example, the annual rainfall on 6684-foot Mount Mitchell, the highest mountain in eastern United States, averages 74 inches, while nearby at Asheville in the sheltered valley of the French Broad the average annual rainfall is 38 inches. The highest average annual rainfall in the eastern United States is recorded in this region. The maximum annual average is 93 inches at Coweeta in the upper Little Tennessee basin. Many stations located in the highlands throughout the three watersheds have annual averages of more than 70 inches. Minimum annual long-term rainfall averages in the lower valley areas generally range between 40 and 50 inches.

The abundant rainfall is conducive to lush vegetation, and an estimated 80 percent of the area is forest-covered.

General Description of the Storms

A combination of upper air circulation and surface system movement brought general rains over western North Carolina and produced a maximum of nearly 18 inches at Rosman, North Carolina, on September 28-30. The second storm on October 4-5, associated with the passage of Hurricane Hilda, resulted again in heavy rainfall over the Blue Ridge Divide region of western North Carolina. The station at Rosman had the distinction of recording the maximum amount, which again was nearly 18 inches. The total rainfall at Rosman for the period September 28-October 5 was 35.4 inches which, as far as knowledgeable records are concerned, is a maximum of record for an 8-day period in the Tennessee Valley. The frontispiece isohyetal map shows the distribution of the total rainfall for the period September 28-October 5, 1964, over the Tennessee River Basin. A third storm on October 16-17, associated with Hurricane Isbell, threatened the eastern section of the Tennessee Valley and caused concern in some localities, but resulted only in superficial stages on streams in the area of previous heavy rainfall. This storm is not discussed in detail in the report.

Record-breaking stages on October 4-5 were confined to only a few streams in the extreme headwater areas along the Blue Ridge Divide. The magnitude of the floods decreased rapidly as the streams traversed areas of decreasing rainfall. Ample storage space was available in the downstream TVA tributary reservoirs, and they received the flood runoff without resorting to unusual operations. The effect of the floods of September-October 1964 upon the operation of the reservoir system is discussed in Appendix A.

Urban flood damage occurred mostly in the communities of Asheville, Hendersonville, Brevard, Rosman, and Franklin, North Carolina. Rural area flood damage occurred in the areas near these communities and along the streams above them. Damage in the upper Hiwassee River basin was mostly rural in nature.

Investigation of Floods

During and following the floods investigations of the rainfall, runoff, and flood damages were made by TVA personnel. This report summarizes these investigations with reference particularly to meteorology, rainfall, runoff, the story of the floods, flood damages, and TVA tributary reservoir operations during and after the floods.

In addition to the material published in this report, there is contained in the files of the TVA Hydraulic Data Branch a considerable quantity of data collected during the investigations which has been used as basic information but is not reproduced. Supplemental catches of precipitation were located in the more intense part of the storm area, to augment the records at the regularly established rain gaging stations. The limits of the flood overflow were defined where the flood affected important populated areas. Flood-crest profiles were marked along more than 300 miles of stream channel. Photographs of the flood were taken by a TVA photographer using an airplane and by TVA field personnel who were on the ground. These photographs and others collected from newspapers, professional photographers, and other sources provide a photographic record in considerable detail. Selected views from this collection are included in Appendix F in this report. Others are available in the files of the TVA Hydraulic Data Branch.

Estimates of the flood damages were made throughout the flood area. The greatest detail was obtained in the communities and urban areas where the damage was most severe. In the rural areas investigations were made in less detail.

The estimates were made upon the basis of interviews with residents, owners of businesses, agricultural agents, local and state officials, and after inspection by TVA personnel.

Personnel of the U. S. Geological Survey were in the field making measurements of discharge during the floods. After the floods had passed, indirect methods of discharge determination were used to define the peak discharge at many points not accessible during the flood or where time did not permit making measurements during the flood.

This report summarizes these investigations and describes the storms and floods. The first section (Section I) of the report discusses the meteorology of the storms. The next three sections are descriptions of the floods with reference particularly to rainfall, runoff, stories of the floods, and flood damages for each of the three major river basins in the area affected by the floods: Section II covers the upper French Broad River basin, Section III the upper Little Tennessee River basin, and Section IV the upper Hiwassee River basin. Section V, Appendices, contains a description of the operation of TVA reservoirs during and after the flood, daily rainfall amounts at stations in the storm area, additional flood damage tables, selected photographs showing October 4-5 flood scenes, and reproductions of newspaper stories about the floods.

ACKNOWLEDGMENTS

Acknowledgment is made to the Asheville, North Carolina, Atlanta, Georgia, and Chattanooga, Tennessee, offices of the U. S. Geological Survey, Surface Water Branch, for furnishing much of the stream stage and discharge data given in this report. Advance data were made available promptly for use in studies of runoff from the watersheds within the flood territory. These data in some instances are provisional and are subject to revision later.

Acknowledgment is made to the U. S. Weather Bureau, Alcoa, Tennessee, for preparing the Meteorology section of the report.

The TVA Hydraulic Data Branch prepared the sections on storm rainfall, flood runoff, story of the floods, and flood damages. The TVA Agricultural Economics Branch prepared a part of the crop damage estimates for the upper French Broad

River basin, and personnel of the TVA Flood Control Branch assisted in the damage investigation in that area. The TVA River Control Branch prepared the section on reservoir operations.

Acknowledgments for furnishing of photographs are listed in Appendix F.



I.

METEOROLOGY OF THE RAINSTORMS

OF

SEPTEMBER 28-29 AND OCTOBER 4-5, 1964

METEOROLOGY OF THE RAINSTORMS
OF
SEPTEMBER 28-29 AND OCTOBER 4-5, 1964

Storm of September 28-29

The general circulation pattern from late afternoon of the 26th through noon of the 29th was southwesterly above 6000 feet and southerly to southeasterly below 5000 feet. This pattern brought a strong inflow of moisture-laden air into the Carolinas and eastern Tennessee.

The surface pattern indicated a high-pressure ridge oriented NE-SW from the north Atlantic through the Carolinas to Georgia and a semi-stationary front from eastern Virginia through Tennessee to northern Alabama into the western Gulf. As the surface system moved east and southeast, general rains began in western North Carolina on the 28th, and by late evening of the 28th the surface front had become stationary from Cape Hatteras, North Carolina, westward to Chattanooga and remained in this position for 12 to 15 hours before moving eastward into the Atlantic. The circulation pattern also changed to a westerly flow above 6000 feet and northerly below 5000 feet later afternoon and night of the 29th. The combination of upper air circulation and surface system movement produced general rains over western North Carolina and eastern Tennessee. The topography, strong convergence, and semi-stationary front gave extremely heavy rains of near 18.00 inches to Rosman, North Carolina, on the 28th and 29th.

Storm of October 4-5

General circulation on early morning of the 4th was light southerly above 5000 feet and light northerly below 5000 feet. This pattern changed rapidly during the morning of the 4th to strong southerly flow above 5000 feet and southeasterly below 5000 feet and continued until late afternoon of the 5th when upper winds became westerly and surface winds northerly.

At 1 a.m. of the 4th the surface pattern consisted of a high pressure in Virginia and a ridge westward to Illinois, a low pressure in the Great Lakes area with a trailing cold front southwest to southern Kansas. Hurricane Hilda was located just south of New Orleans. By 1 p.m. a rapid change in the surface systems had

taken place. The front had moved to southeast lower Michigan to Little Rock and a warm front from central North Carolina to southeast lower Michigan. Hurricane Hilda had moved inland to just west of New Orleans. General rains began early morning of the 4th through the Carolinas due to strong southerly flow of moisture-laden air being lifted by the terrain. As the frontal system continued eastward movement, Hurricane Hilda was picked up by the frontal system as a low pressure, rains continued from southern Alabama northeastward through the Carolinas into Virginia, and by the evening of the 5th the system was located along the North Carolina coast southward to Florida. The rains had tapered off in western North Carolina. However, during the passage of the system the circulation around Hilda produced strong convergence and topographical effects which gave another period of extremely heavy rains totaling over 17.00 inches at Rosman, North Carolina. The combined total rainfall at Rosman for the two periods was 35.4 inches.

II.

FLOODS OF SEPTEMBER-OCTOBER 1964

IN THE

UPPER FRENCH BROAD RIVER BASIN

FLOODS OF SEPTEMBER-OCTOBER 1964
IN THE UPPER FRENCH BROAD RIVER BASIN

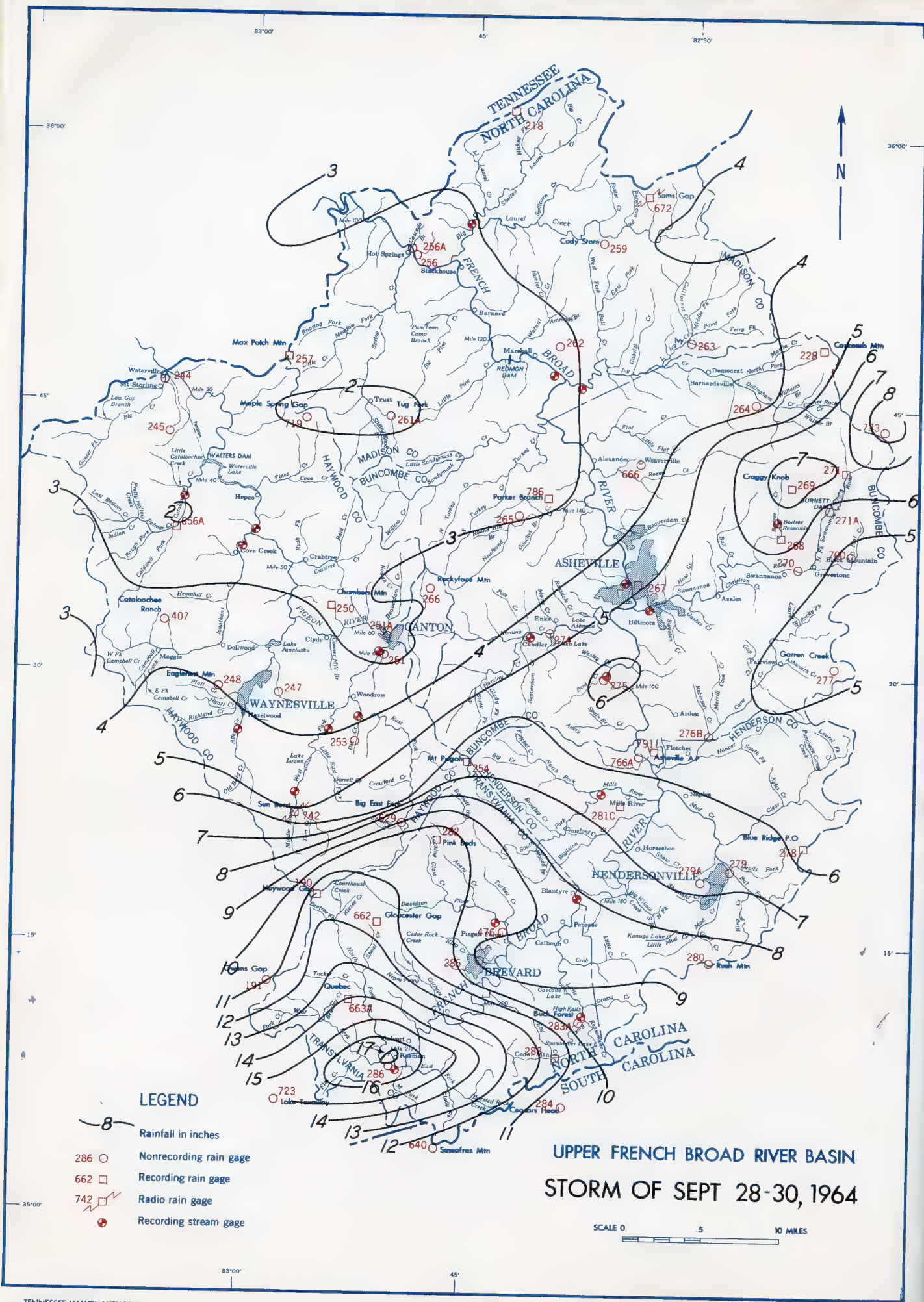
INTRODUCTION

Two storms in a period of seven days over the headwaters of the French Broad River produced floods which were the most damaging experienced in the upper portion of the river basin since July 1916.

The first storm, on September 28-30, coming after several weeks of dry weather, was most severe near Rosman, at the head of the river, and over the forks of the French Broad River which converge near that community. The resulting flood at Rosman was only a little less severe than the record flood of July 1916. A large part of the town was overflowed with damage to homes, businesses, roads, and bridges. Downstream from Rosman the flood crest dropped off in relation to the great 1916 flood, but was still sufficient to cause wide overflow of agricultural lands in Transylvania and Henderson Counties. At and below Asheville the river remained within its banks.

Tributary streams fell rapidly after the first flood and were mostly near normal seasonal levels when the second storm hit on October 4-5; but in the reach of the French Broad River in Transylvania and Henderson Counties, where the river channel gradient is very flat, the stream was within its banks but still quite high. In this storm the rainfall was more widely distributed and, with conditions favorable for much higher runoff, the resulting flood was more severe and more widespread than that following the first storm.

The French Broad River this time exceeded the 1916 flood through most of Rosman and was within a foot or so of the 1916 flood crest height all along its course through Transylvania County. Through Henderson and Buncombe Counties, the flood crest dropped off in relation to the 1916 flood. At Asheville it was 12 feet under the 1916 crest height but a little above the height of the flood of August 30, 1940, the last serious flood to hit the city. The flood was serious on many of the tributaries as well as on the main stream. At Hendersonville the flood on Mud Creek exceeded any since 1916 and there was heavy damage in the developments



which have sprung up on the flood plain in recent years. Little River exceeded all floods since 1916 also, and Davidson River was higher than any flood since August 1928. Total damage in the upper French Broad basin from the floods of September-October 1964 is estimated at \$1,805,000.

STORM RAINFALL

Prior Precipitation

Precipitation over the upper French Broad River basin above Asheville was greater than normal during the two months prior to September 1964. The average for July was 8.1 inches, 2.0 inches above normal, and for August 9.9 inches, 3.8 inches above normal. September prior to the storm of September 28-30 was relatively dry and, had it not been for the storm, would have been one of the driest Septembers of record in this area. The average for September 1-27, 1964, was 1.2 inches or 30 percent of the 4.0-inch normal.

Storm of September 28-30

The isohyetal map on Plate 1 shows the distribution of the rainfall over the upper French Broad River basin during the period September 28-30. This storm caused flood stages on most of the streams above Asheville and in addition thoroughly soaked the ground in advance of the equally intense storm of October 4-5. Several supplemental rainfall catches were obtained in the vicinity of Rosman following the storm of September 28-30. Acceptable catches ranged from 12 to 15 inches. These data were used to supplement rainfall station network records in developing the isohyetal map.

The heaviest precipitation occurred upstream from Brevard, where rainfall in excess of 10 inches was reported at several stations. The highest rainfall reported was 17.24 inches at Rosman. Downstream from Brevard the rainfall decreased gradually and averaged about 2 to 3 inches along the Tennessee-North Carolina state line. Heavy rains began to fall at all stations in the basin around 8 to 10 p. m. on September 28. In the period of some 60 hours up to observation time on the morning of October 1, the rainfall averaged 7.6 inches over the French Broad River basin above Asheville, an area of 945 square miles.

Averages of flood-producing rainfall over selected watershed subdivisions in the upper French Broad and Pigeon River basins are shown in Table 3. on page 24.

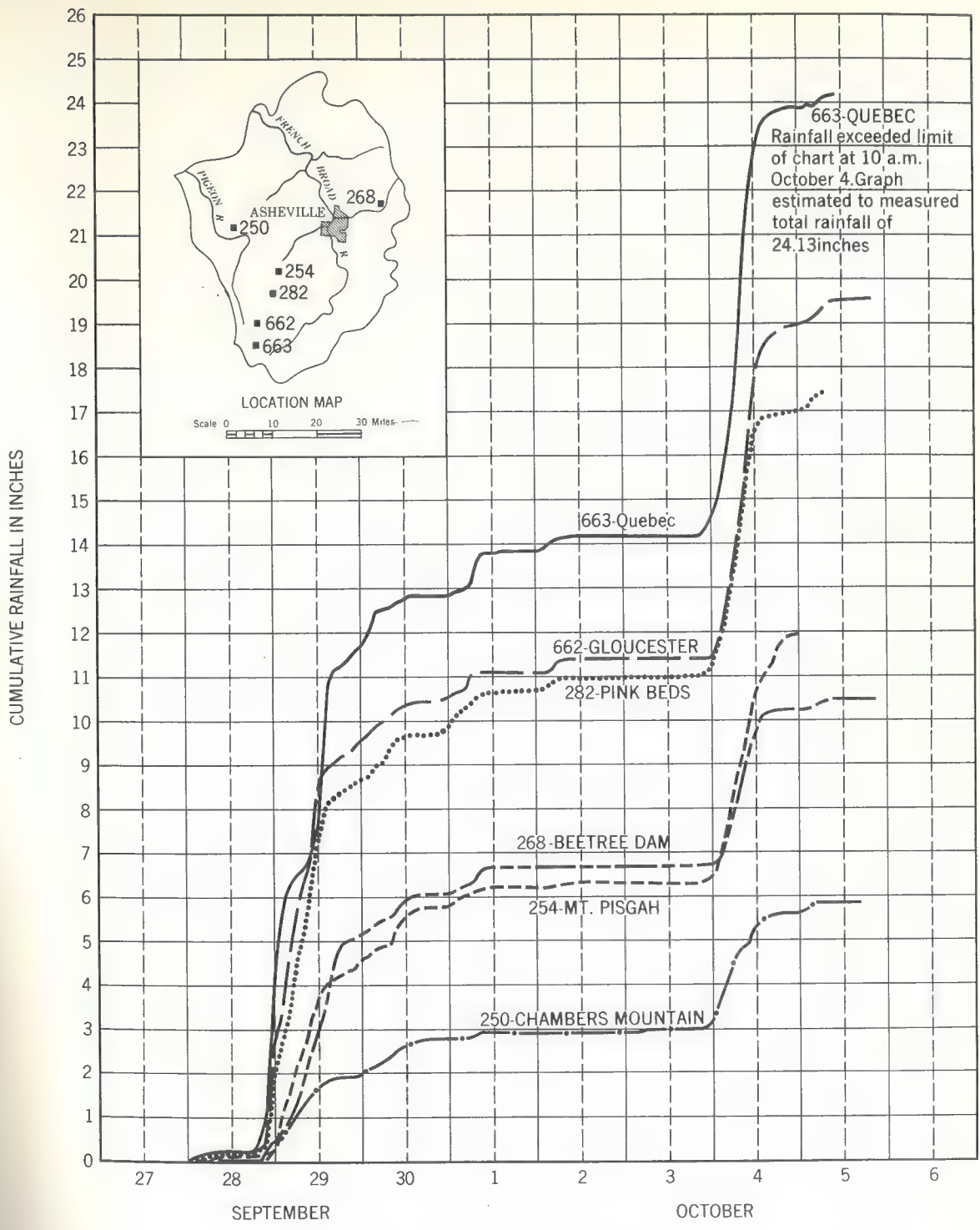
Plate 2 shows accumulated precipitation at selected recording stations in the upper French Broad River basin for the period September 27 to October 6. The chart shows that the flood-producing rain fell in three distinct intensity periods. The first and most intense rain fell from around 8 to 10 p. m. on September 28 until around 2 to 4 p. m. on September 29. Heavy but less intense rain fell during the second period from about 2 to 4 p. m. on September 29 until around noon to 4 p. m. on September 30. Rainfall averaging less than one-half inch fell from around midnight on September 30 to observation time on the morning of October 1. Rainfall averaging less than 0.3 inch fell on September 28 prior to the beginning of the flood-producing rainfall.

Storm of October 4-5

Light showers occurred between observation time on the morning of October 1 and the beginning of the intense storm of October 4-5. The average rainfall over the basin above Asheville during this $2\frac{1}{2}$ -day period was 0.3 inch. These light showers served to keep the ground wet prior to the October 4-5 storm.

The isohyetal map on Plate 3 shows the rainfall distribution over the upper French Broad River basin for the storm of October 4-5. This storm produced crest stages higher than those resulting from the earlier storm of September 28-30.

The October 4-5 storm, like the storm of September 28-30, produced the heaviest rainfall over the area above Brevard. Several stations reported amounts in excess of 10 inches, the Rosman station again reporting the maximum storm total, 17.53 inches. The isohyets for the September 28-30 and October 4-5 storms are surprisingly similar in configuration. As with the September 28-30 storm, the rainfall during the October 4-5 storm decreased gradually downstream from Brevard and averaged about 1.5 inches along the Tennessee-North Carolina state line. Intense rain began to fall at all stations in the area at 11 or 12 p. m. on October 3, and up to observation time on October 5 an average of 7.2 inches had fallen over the basin above Asheville. October 4-5 storm averages over selected watershed subdivisions in the upper French Broad and Pigeon River basins are shown in Table 3. on page 24.



CUMULATIVE RAINFALL
STORMS OF SEPTEMBER-OCTOBER 1964
AT SELECTED STATIONS
IN UPPER FRENCH BROAD RIVER BASIN

All graphs plotted to Eastern Standard Time.
Dashed vertical line indicates 12 noon.

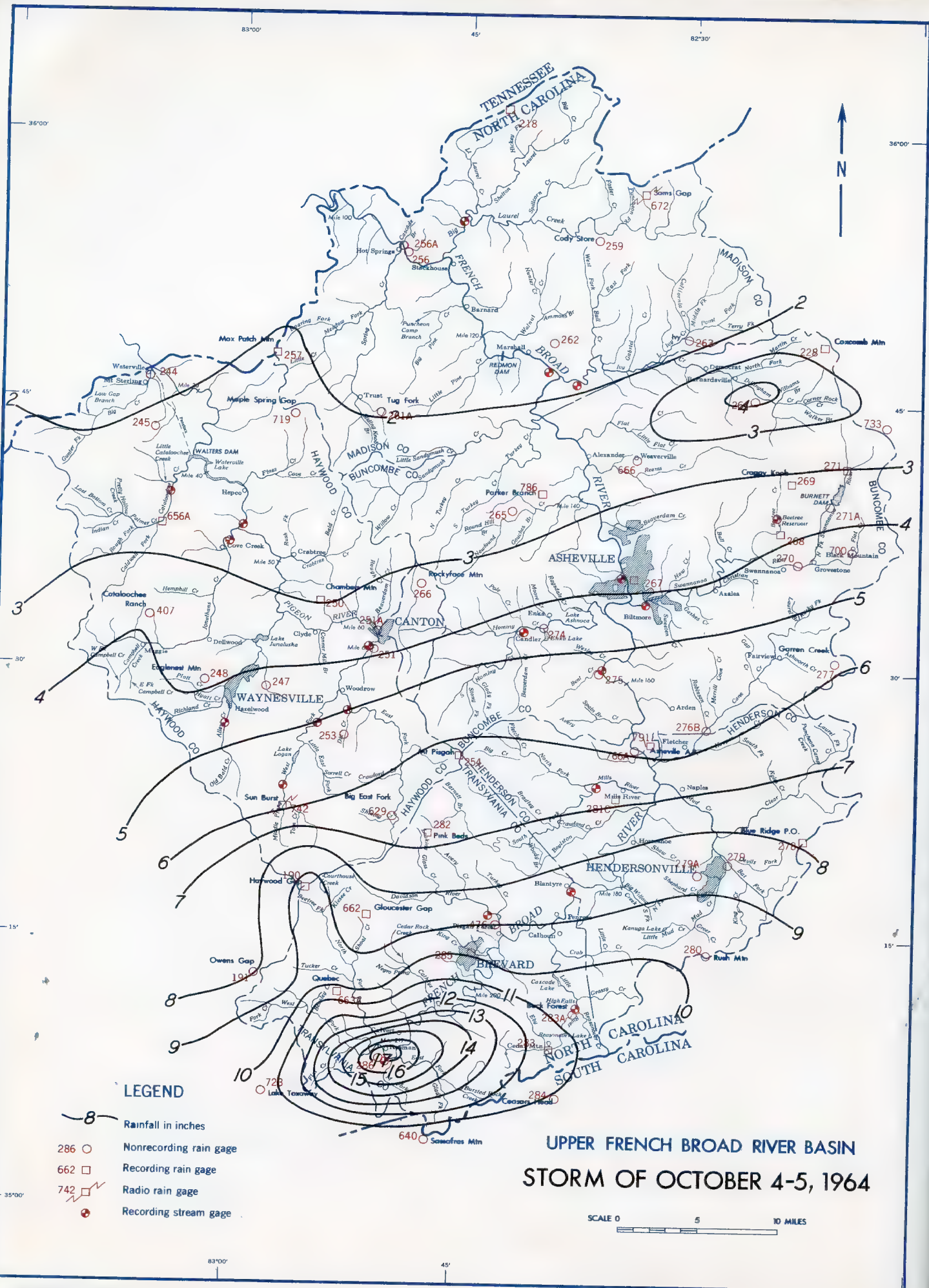


Plate 2 shows cumulative precipitation at selected recording stations for the storm of October 4-5 and gives a comparison with the September 28-30 storm. The storm was characterized by a period of very intense rain beginning at 11 or 12 p.m. on October 3 continuing to about 3 p.m. on October 4, followed by light rain continuing to mid-morning or early afternoon on October 5. Periods of intense rainfall for the two storms were nearly the same, being about 16 hours for the October 4-5 storm and about 18 hours for the September 28-30 storm.

Total Rainfall, September 28 to October 5

Total rainfall during the 8-day period September 28 to October 5 ranged up to a maximum of 35.38 inches at Rosman. In the Tennessee River Basin, this was a maximum for any station and probably a maximum of record for an 8-day period. The maximum previously known 8-day total rainfall in the Tennessee River Basin occurred in 1916 when 30.95 inches was recorded near Altapass, North Carolina, during the period July 9-16. Altapass, which is also in the French Broad River basin, is located on the Blue Ridge Divide about 70 miles northeast of Rosman.

The average rainfall over the area above Asheville for the total storm was 15.1 inches. The distribution of the total rainfall is shown on the frontispiece map. Red shading on the map delineates the upper French Broad River area.

Daily rainfall and storm totals for stations located in the upper French Broad River basin are listed in Table 14 in Appendix B.

Storm of October 16-17

Intense rainfall on October 16-17, 1964, associated with hurricane Isbell, caused overbank stages on the French Broad River below Marshall and on some tributaries located downstream from Marshall, especially the Nolichucky River. At Marshall the October 5 crest on the French Broad River was 0.7 foot higher than the October 16 crest, while at Hot Springs, 17 miles downstream from Marshall, the latter flood was 2.3 feet higher than the October 5 flood.

Rainfall for October 16-17 ranged up to 6 inches in the upper Nolichucky, upper Holston, and upper Clinch River basins. Rainfall over the upper French Broad River basin above the Swannanoa River at Asheville ranged up to 3.7 inches, and averaged 2.4 inches.

The high water caused concern in some localities, but damages to agricultural land, roads, and bridges were not great in any of the upper Tennessee River Basin tributaries affected by the heavy rainfall.

TABLE 1
PEAK STAGES AND DISCHARGES FOR STREAMS
IN THE UPPER FRENCH BROAD RIVER BASIN IN NORTH CAROLINA

Stream	Station	Drainage Area sq.mi.	Flood of September 29-30, 1964				Flood of October 4-5, 1964				Previous Maximum Known Flood			
			Peak Stage feet	Amount cfs	Per Sq. Mi. cfs	Date	Peak Stage feet	Amount cfs	Per Sq. Mi. cfs	Date	Peak Stage feet	Amount cfs	Per Sq. Mi. cfs	
French Broad River	at Roanman	67.9	13.31	9,600	141		14.95	13,500	199	July 1916	13.9	-	-	
French Broad River	at Calvert (a)	103	10.60	8,690(b)	84		11.75	13,000(b)	126	July 1916	13.5	-	-	
French Broad River	at Blantyre	296	21.27	11,400	39		25.50	30,000	101	July 1916	27.1	-	-	
French Broad River	at Bent Creek	676	9.51	13,100	19		15.80	30,600	45	July 1916	27.3	-	-	
French Broad River	at Asheville	945	7.59	14,100	15		12.70	36,000	38	July 1916	23.1	110,000	116	
French Broad River	at Marshall	1,332	6.68	15,200	11		10.49	34,100	26	July 1916	22	115,000	86	
Catawba Creek	near Brevard (a)	11.7	3.4	910(b)	78		5.4	2,350(b)	201	July 1949	4.35	1,250	107	
Davidson River	near Brevard	40.4	8.78	4,980	123		10.64	6,470	160	June 1876	11.9	-	-	
Little River	near Cedar Mountain	26.8	4.71	1,960	73		7.30	4,430	165	-	-	-	-	
Little River	near Penrose (a)	41.4	10.25	3,070(b)	74		12.88	4,200(b)	101	July 1916	14	-	-	
Crab Creek	near Penrose (a)	10.9	-	-	-		8.92	2,800(b)	266	July 1916	10.5	-	-	
Boylston Creek	near Horseshoe (a)	14.8	5.22	626(b)	42		7.28	2,500(b)	169	Dec. 1950	5.67	805	54	
Mills River	near Mills River	66.7	6.83	2,560	38		12.24	6,830	102	Aug. 1940	13.62	13,400	201	
Mud Creek	at Naples (a)	109	-	-	-		15.74	-	-	July 1916	21.5	40,000	367	
Clear Creek	near Hendersonville (a)	42.2	-	-	-		12.2	7,600(b)	180	July 1916	16	-	-	
Cane Creek	at Fletcher (a)	63.1	-	-	-		9.73	3,500(b)	56	July 1916	14.8	23,000	364	
Honley Creek	at Candler	79.8	2.73	530	7		7.89	3,470	43	Aug. 1940	18.0	13,100	164	
Swannanoa River	at Biltmore	130	5.95	2,220	17		11.12(c)	5,560	43	Apr. 1791	26	40,000	308	
Beetree Creek	near Swannanoa	5.46	4.29	461	84		3.81	278	51	Aug. 1940	6.20	1,370	251	
Ivy River	near Marshall	158	6.06	1,480	9		6.72	1,970	12	Mar. 1963	14.35	13,300	84	
Big Laurel Creek	near Stackhouse	126	3.79	1,140	9		3.49	893	7	Mar. 1963	9.20	9,940	79	
Pigeon River	at Canton	133	6.94	4,340	33		11.83	11,400	86	Aug. 1940	20.75	31,600	238	
Pigeon River	near Hepco	350	6.35	5,020	14		10.36	14,300	41	Feb. 1902	18	41,000	117	
West Fork Pigeon River	above Lake Logan	27.6	5.60	3,070	111		6.88	4,940	179	Jan. 1959	6.95	5,050	183	
West Fork Pigeon River	below Lake Logan	55.3	6.21	2,990	54		7.99	5,460	99	Apr. 1956	7.80	5,180	94	
East Fork Pigeon River	near Canton	51.5	4.66	1,920	37		7.91	6,920	135	Apr. 1957	7.78	6,640	129	
Allen Creek	near Hazelwood	14.4	2.38	312	22		3.49	953	66	Aug. 1940	7.0	-	-	
Jonathan Creek	near Cove Creek	65.3	2.65	360	6		4.60	1,220	19	Feb. 1961	7.95	3,560	55	
Cataloochee Creek	near Cataloochee	49.2	2.83	182	4		3.85	552	11	Mar. 1963	8.08	5,080	103	

(a) Inactive station.

(b) Estimated from old rating curves extended.

(c) Recession affected by backwater from the French Broad River.

Discharge data are provisional and subject to revision.

FLOOD RUNOFF

Peak Stages and Discharges

Table 1 lists peak stages and discharges for the two floods that occurred during the period September 29-October 6, 1964, at the 21 active stream gaging stations in the upper French Broad and Pigeon River basins, and compares these data with the previous maximum known floods. Similar data, where available, are listed for eight inactive stations. Personnel of the U. S. Geological Survey made indirect measurements of peak discharges on four small ungaged streams following the October 4 flood. Results of these measurements are shown in Table 2. These streams are located in the area of highest rainfall.

Of the 29 stream gaging stations listed in Table 1, fourteen stations recorded peak discharges exceeding a rate of 100 cubic feet per second per square mile of drainage area during the October 4-5 flood. During the September flood only three stations recorded peak discharges exceeding that rate. All of the small streams listed in Table 2 experienced peak rates in excess of 100 cubic feet per second per square mile during the October 4-5 flood.

The highest unit flow observed was 349 cubic feet per second per square mile on Mortons Creek near Reid, North Carolina, where the drainage area is only 1.18 square miles. This is one of the peak rates determined by indirect measurement. The maximum unit flow observed at the gaging station sites was 266 cubic feet per second per square mile at the former USGS gage site on Crab Creek near Penrose, where the drainage area is 10.9 square miles. The drainage areas for some of the ungaged sites, being much smaller than those at the stream gages and also being in the area of highest rainfall, tend to produce peak rates of discharge greater than those at the gaged sites. The station on the French Broad River at Rosman experienced a peak discharge of 141 cubic feet per second per square mile during the September 29-30 flood, a maximum observed for this flood.

Values of the coefficient "K" in the flood formula, peak discharge = $K\sqrt{\text{drainage area}}$, ranged up to a maximum of 1,740 at the Blantyre gage on the French Broad River for the crest of October 4-5. On the French Broad River the "K" values at other stations for the October 5 flood varied from 1,640 at Rosman to 1,170 at Asheville.

TABLE 2
UPPER FRENCH BROAD RIVER BASIN
INDIRECT MEASUREMENTS OF PEAK DISCHARGE

FLOOD OF OCTOBER 4, 1964

<u>Stream</u>	<u>Location</u>	<u>Drainage Area sq. mi.</u>	<u>Discharge</u>	
			<u>Amount cfs</u>	<u>Per Sq. Mi. cfs</u>
Jason Branch near Rosman, N. C.	Lat. $35^{\circ}12'05''$, long. $82^{\circ}51'21''$, at pipe culvert on Secondary Road 1321, 300 feet above mouth, and 4.4 miles northwest of Rosman, Transylvania County.	0.45	94*	209
North Fork French Broad River near Calvert, N. C.	Lat. $35^{\circ}09'12''$, long. $82^{\circ}50'24''$, 300 feet downstream from Diamond Creek, 1.2 miles northwest of Rosman, Transyl- vania County.	37.0	6,120	165
Mortons Creek near Reid, N. C.	Lat. $35^{\circ}07'29''$, long. $82^{\circ}53'55''$, at culvert on U.S. Highway 64, 0.5 mile above mouth and 0.6 mile northeast of Reid, Tran- sylvania County.	1.18	412	349
Middle Fork French Broad River near Middle Fork, N. C.	Lat. $35^{\circ}06'25''$, long. $82^{\circ}48'13''$, above U.S. Highway 178, 1.1 miles above Shoal Creek and 1.4 miles southeast of Middle Fork, Transylvania County.	1.66	251*	151
Middle Fork French Broad River at Middle Fork, N. C.	Lat. $35^{\circ}06'35''$, long. $82^{\circ}48'34''$, at bridge on U.S. Highway 178, 0.7 mile above Shoal Creek and 0.9 mile southeast of Middle Fork, Transylvania County.	2.18	600	275

*Provisional data, subject to final review and revision.

Data furnished by U. S. Geological Survey.

Runoff-Rainfall Ratios

The average rainfall and total runoff values were determined for the two storms at selected gage locations in the basin. These are shown in Table 3, together with the runoff-rainfall ratios in percent. Runoff as discussed in the report is the total volume of runoff from the heavy rainfall of the two storms which produced the floods. It includes both surface and ground-water runoff resulting from the flood-producing rainfall. Both the prior and post-storm runoff have been separated from these totals.

Runoff-rainfall ratios were higher for the October 4-5 flood than for the September 29-30 flood. Runoff during the September 29-30 flood ranged from 5 to 26 percent of the rainfall and during the October 4-5 flood from 17 to 52 percent. Although the flood-producing rainfall of the two storms was approximately equal in amount and intensity, the September storm falling on dry ground produced considerably less runoff than the October 4-5 storm which fell on wet ground. The seasonal effect upon the runoff-rainfall ratios is reflected in the low percentages. Greater percentages than these would result from similar storms if they occurred in the winter months. A comparison of the runoff-rainfall ratios experienced in these storms with those of a number of other floods is shown in Table 4. The runoff-rainfall ratios for the October 4-5 storm are similar to those for the other storms occurring in the summer season. The ratios for the September 28-30 storm reflect the extremely dry conditions which preceded this storm. The highest ratios of runoff to rainfall during both storms occurred on the smaller mountain streams in the area of heaviest rainfall. The maximum ratio of runoff to rainfall was 52 percent and occurred on West Fork Pigeon River above Lake Logan, for the October 4-5 flood. The maximum ratio for the September 29-30 flood was 31 percent on the Little River near Cedar Mountain.

Stage and discharge hydrographs are shown on Plates 10 to 19, in Appendix C, for selected gaging stations located in the upper French Broad River basin. Hydrograph plates are shown for only those stations where the peak stages exceeded bankfull stage in either one or both of the floods.

Comparison of Flood of September 29-30 with Past Floods

The flood following the storm of September 28-30 was serious on the forks of the French Broad River, principally North Fork and West Fork, and on the main stream at Rosman and along its course through Transylvania and Henderson

TABLE 3

FLOODS OF SEPTEMBER-OCTOBER 1964

RAINFALL AND RUNOFF VOLUMES FOR SELECTED STREAMS

IN THE UPPER FRENCH BROAD RIVER BASIN IN NORTH CAROLINA

Stream	Station	Drainage Area sq. mi.	Storm of September 28-30			Storm of October 4-5		
			Average Rainfall inches	Flood Runoff inches	Runoff- Rainfall Ratio percent	Average Rainfall inches	Flood Runoff inches	Runoff- Rainfall Ratio percent
French Broad River at Rosman		67.9	13.4	2.7	20	10.4	4.2	40
French Broad River at Blantyre		296	11.6	2.8	24	10.5	4.9	47
French Broad River at Bent Creek		676	8.6	1.9	22	8.4	4.3	51
French Broad River at Asheville		945	7.6	1.6	21	7.2	3.7	51
French Broad River at Marshall		1,332	6.5	1.2	18	5.8	2.6	45
Davidson River near Brevard		40.4	10.5	2.5	24	7.6	3.8	50
Little River near Cedar Mountain		26.8	11.1	3.4	31	11.4	5.7	50
Mills River near Mills River		66.7	7.3	1.3	18	6.5	2.6	40
Hominy Creek at Candler		79.8	4.4	0.2	5	4.5	1.1	24
Swannanoa River at Biltmore		130	5.9	1.1	19	3.7	1.6	43
Beetree Creek near Swannanoa		5.46	7.2	2.0	28	3.0	1.4	47
Ivy River near Marshall		158	4.0	0.4	10	2.3	0.4	17
Big Laurel Creek near Stackhouse		126	3.6	0.3	8	1.5	0.3	20
Pigeon River at Canton		133	5.7	0.9	16	5.8	2.4	41
Pigeon River near Hepco		350	4.2	0.5	12	4.4	1.3	30
West Fork Pigeon River above Lake Logan		27.6	7.3	1.9	26	6.9	3.6	52
West Fork Pigeon River below Lake Logan		55.3	6.1	1.0	16	6.3	2.4	38
East Fork Pigeon River near Canton		51.5	6.2	0.9	15	6.0	2.9	48
Allen Creek near Hazelwood		14.4	4.9	0.6	12	5.3	1.9	36
Jonathan Creek near Cove Creek		65.3	3.3	0.3	9	3.5	0.6	17
Cataloochee Creek near Cataloochee		49.2	2.6	0.2	8	2.7	0.5	19

TABLE 4
UPPER FRENCH BROAD RIVER BASIN
COMPARISON OF RUNOFF-RAINFALL RATIOS

<u>Stream</u>	<u>Station</u>	<u>Flood Date</u>	<u>Drainage Area</u> sq. mi.	<u>Average Rainfall</u> inches	<u>Average Runoff</u> inches	<u>Runoff-Rainfall Ratio</u> percent
French Broad	Rosman	Mid-Aug. 1940	67.9	11.7	3.7	32
		Late Aug. 1940		8.5	3.0	36
		Jan. 1957		10.7	8.2	77
		Sept. 1964		13.4	1.6	12
		Oct. 1964		10.4	3.2	31
French Broad	Blantyre	Mid-Aug. 1940	296	11.5	4.3	37
		Late Aug. 1940		7.8	3.1	40
		Jan. 1957		10.7	7.0	65
		Sept. 1964		11.6	2.2	19
		Oct. 1964		10.5	4.0	38
French Broad	Asheville	Mid-Aug. 1940	945	10.0	2.9	29
		Late Aug. 1940		7.6	2.5	33
		Jan. 1957		8.1	4.3	53
		Sept. 1964		7.6	1.0	13
		Oct. 1964		7.2	2.9	40

Counties. Through Buncombe and Madison Counties the stream was generally within its banks.

French Broad River--The French Broad River at the stream gaging station in Rosman crested at 4 p. m. on September 29 at a stage of 13.31 feet. This was the highest since continuous records began at the site in 1935 and just 0.6 foot under the crest height for the flood of July 1916 as determined from high water marks. At Calvert, 2.4 miles below Rosman, at the site of a discontinued gaging station, the crest was 10.60 feet, 2.9 feet under the 1916 flood height and about one foot under the flood of August 13, 1940. At Blantyre, 33 miles downstream from Rosman, the flood crested at 7 a. m. on September 30 at a stage of 21.27 feet, the highest since a crest of 21.89 feet on August 14, 1940, and 5.8 feet under the 1916 flood. At the stream gage at Bent Creek, 59 miles below Rosman, the crest was 9.51 feet, 3.1 feet under the flood of August 14, 1940. At Asheville the flood crest was 7.59 feet, just under bankfull stage and lower than a number of floods which have occurred in recent years.

Tributaries--At the gaging station on Davidson River near Brevard the September 1964 flood crested at 8.78 feet, the highest since a flood in June 1949 and 0.4 foot under the August 13, 1940, flood. At a former gaging station on Little River near Penrose the crest was at 10.25 feet, a little under a flood on March 12, 1952, and 0.7 foot under the August 13, 1940, flood. The flood was less noteworthy on the tributaries farther downstream, with relatively little overbank flow on streams in Henderson County and none on streams in Buncombe and Madison Counties.

Comparison of Flood of October 4-5 with Past Floods

The flood following the storm of October 4-5 was higher than the September 1964 flood at all gaging stations. There was serious flooding along the French Broad River as far downstream as Marshall and on all the tributaries which join the river in both Transylvania and Henderson Counties.

French Broad River--The elevation of the flood crest of October 4-5 was established on the French Broad River from its head at Rosman through Hot Springs, a distance of 113 river miles.

At the Rosman stream gage the crest was 14.95 feet, 1.64 feet higher than the September 29 flood and about one foot higher than the July 1916 flood. In the upper part of Rosman, in the vicinity of the Southern Railway bridge, there is evidence that the 1916 flood was a little higher than this flood, but below that point, in the more developed part of Rosman, this flood exceeded the flood of July 1916.

At the Calvert stream gage site the flood crest was 11.75 feet on the gage, 1.15 feet above the September 29 flood but about 1.7 feet lower than the 1916 flood. The drainage area above the Rosman stream gage includes only the two principal tributaries North and West Forks of French Broad River. Middle Fork and East Fork join the stream between the Rosman gage and Calvert. The latter two streams had large floods following the October 4-5 storm, but not so great as in 1916.

A comparison of high water marks shows that this flood was 1 to 2 feet lower than the 1916 flood from Calvert downstream past Brevard to the stream gage at Blantyre on the Transylvania-Henderson County line. The crest at Blantyre was 25.50 feet, 1.6 feet under the July 1916 flood. Below Blantyre the flood crest

drops off gradually in relation to the 1916 flood profile, to a 6-foot difference at the mouth of Mills River and a 7-foot difference at the mouth of Cane Creek, near the end of the long flat reach of the stream where the more intensive agricultural development is found. In the vicinity of Asheville, the October 1964 flood was about 12 feet lower than the 1916 flood.

Between Rosman and the mouth of Hominy Creek at Asheville, the October 1964 flood was generally 3 to 4 feet higher than the mid-August 1940 flood. Through Asheville it was about one foot higher than the late August 1940 flood, which exceeded the mid-August flood below Hominy Creek, but at Marshall and Hot Springs the October 1964 flood was 6 to 8 feet lower than the August 30, 1940, flood.

Headwater Tributaries--Direct comparison of the floods of September and October with the large floods of the past is difficult for the tributaries in the headwater area near Rosman. This is due in part to a scarcity of information on past floods on streams and in part to changes which have been wrought by gravel removal operations or highway work along the streams. Both floods were large on the two forks above Rosman, North Fork and West Fork, where they may well have exceeded the large floods of 1940 and 1916. On Middle Fork and East Fork of French Broad River the October floods were much larger than the floods on September 29, but the relation to past floods is uncertain. The same was true for the tributary Catheys Creek, whose drainage area adjoins that of North Fork on the east. The crests of the two floods were marked on the lower reaches of each of these tributaries.

Davidson River--The flood on September 29 reached a crest stage of 8.78 feet at the stream gage on Davidson River 2.2 miles above the mouth. This was the highest since a crest of 9.20 feet on August 13, 1940, and exceeded a flood on June 16, 1949, by just 0.1 foot. The October 4 flood reached a stage of 10.64 feet, exceeding any flood since August 1928 when the crest stage was 11.8 feet.

Little River--The September 29 flood crest was at 10.25 feet at the site of an abandoned gage 4 miles above the mouth. The crest stage on October 4 was 12.88 feet, which was higher than the August 1940 floods but a foot or so lower than the crest height for the 1916 flood.

Boylston Creek--The crest stage on September 29 was 5.22 feet at a former gage site on Boylston Creek. The October 4 flood reached 7.28 feet, higher than any flood in the period of gage record on the stream, 1943-1955.

Mills River--The September 29 flood reached a crest of 6.83 feet at the stream gage on Mills River 4.6 miles above the mouth. The crest of 12.24 feet on October 4 was the highest since the record stage of 13.62 feet on August 30, 1940.

Mud Creek--The flood on September 29, 1964, was not particularly noteworthy on Mud Creek and its tributaries. The streams were out of banks at a number of points but overflow depths were shallow.

The flood on October 4 was higher than any flood since 1916 on Mud Creek through the developed areas at Hendersonville, and it exceeded the height reached in 1916 at some points where changes on the flood plain have materially altered flow conditions. Between Hendersonville and Balfour the flood profile is higher than in 1916, apparently because of changes in the channel and overbank conditions. Below Balfour the profile falls far below that of the 1916 flood but it exceeds that of the August 1928 flood, the two floods of August 1940, and all recent floods.

A stream gage was maintained on Mud Creek at Naples, at a site 2.2 miles above the mouth, from 1938 until 1955. The October flood crest was 15.64 feet at the gage site, higher than the crest of any known flood except the 21.5-foot stage determined from high water marks for the 1916 flood. Conditions at the gage have changed since 1955 because of filling and shifting in the dredged channel.

On Clear Creek the October 1964 flood crest was 12.2 feet at the abandoned stream gage at Mile 1.2. This was about the same height as the August 13, 1940, flood and about one foot and four feet, respectively, lower than the floods of August 1928 and July 1916.

On the tributaries in the immediate vicinity of Hendersonville, Bat Fork, Devils Fork, and King Creek, the October flood equaled or exceeded the large flood on these streams in August 1961. On the lower reaches at Bat Fork and Devils Fork, backwater from Mud Creek put the flood near the 1916 flood height. High water marks were set on these streams and on Clear Creek.

Cane Creek--At the former stream gage operated from 1942 to 1955 on Cane Creek at Mile 3.8, the October 4 flood crest was 9.73 feet, about 0.3 foot higher than the August 30, 1940, flood, but about 5 feet lower than the flood of July 1916. There have been changes in flow conditions near the gage site and direct comparisons of crest heights are subject to possible error. Marks of the flood crest have been set from the mouth to Fairview, Mile 12.2. Upstream from the stream gage site the flood height appears to have been very near that of the August 30, 1940, flood. Backwater from the French Broad River put the flood higher than the 1940 floods near the mouth.

Other Tributaries--Hominy Creek at the Candler stream gage reached a stage of 7.89 feet, 10 feet lower than the flood of August 30, 1940.

Swannanoa River at Biltmore had a crest of 11.12 feet, less than bankfull stage in this reach and 8 feet lower than the August 13, 1940, flood.

Pigeon River at Canton had a crest of 11.8 feet, only 0.2 foot under bankfull stage, but 9 feet lower than the record flood of August 30, 1940.

STORY OF THE FLOODS

The Story of the Flood of September 29-30

Rosman--During the night of September 28-29, rainfall which was near 4 inches caused a rise in the French Broad River at Rosman that crested about one foot over the bankfull stage in the early morning hours. The river had receded about 2 feet when an intense storm that dumped another 4 inches of rain in a short period of time caused a rise in the river which many of the residents of Rosman stated was the fastest they had ever seen. The river reached bankfull stage of 8 feet at 2 p.m. and was at its crest of 13.31 feet two hours later. With the peak stage just 0.6 foot lower than the great flood of July 1916, much of the town was flooded. The river fell almost as fast as it had risen, and the stream was back within its banks at Rosman before midnight.

Traffic was halted when water overflowed U. S. Highway 178 in Rosman and on the right-bank flood plain downstream from the town. Two bents were washed out at the Southern Railway trestle which crosses the river in Rosman and water was over the tracks on the left bank in the lower part of town. Floodwaters flowed down the street which parallels the left bank of the river, entering 20 homes and businesses and surrounding some 37 other buildings. The water rose so rapidly that people had little time to move furniture or carpets out of the flood's reach or

even to get automobiles out of the flood area. Depth of flooding in homes ranged up to 1.3 feet. The two homes with basements were flooded, with heavy damage to furnaces, utilities, and freezer-stored food.

At a number of buildings the flood damage was reduced by keeping doors tightly blocked against the flood. At a grocery store water was nearly a foot deep outside the store but was held to about half that depth on the inside. At a church parsonage and at one other home tightly sealed doors kept water out although water rose above the floor levels outside. There was damage to gardens, lawns, and shrubbery, but losses of this kind were not great.

Red Cross and rescue squad personnel were on duty during the flood, using boats and high-wheeled vehicles to evacuate people and assist stranded motorists.

French Broad River--Above Rosman, on North and West Forks of French Broad River and on their tributaries, water was over secondary roads and flooded the narrow bottom lands. There was a minimum effect, however, upon traffic on U. S. Highway 64 and on the road connecting Rosman with the North Fork - Balsam Grove communities.

There was widespread overflow of the agricultural lands along French Broad River in Transylvania and Henderson Counties between Rosman and the head of Buck Shoals. With the flat slope in this reach, water stayed on the bottom lands for several days. At Blantyre, where conditions are representative of the greater part of the reach, the stream began flowing out of its banks late on September 29 and remained out of banks for about $3\frac{1}{2}$ days, until early on October 3.

Some farm crops had been gathered but harvesting of grain corn and silage corn was just getting well under way when the overflow began. The truck crop operations also were mostly finished for the year but there were a number of places where some of these high-value crops were still in the fields. Likewise, the picking of gladioli flowers was about completed for the season and most of the flower producers had begun harvesting of the flower bulbs when the heavy rains on September 28-29 stopped work in the fields. The overflow covered flowers still in the fields and bulbs still in the ground and in a few instances washed away crated bulbs which were stacked in the field ready for hauling to storage houses.

Water was over U. S. Highway 276 south of Brevard Tuesday night and most of Wednesday. Secondary roads on the flood plain were flooded and water was over the tracks of the Toxaway Line of the Southern Railway at a number of places. Schools in Transylvania County were closed on Wednesday, September 30, because of the damage and flooding of roads.

Tributaries--On Davidson River overflow was moderate except near the mouth where it was affected by backwater from the French Broad River. There were places where overflow occurred along lower Little River and along Mud Creek and its tributaries, but the effects on crops and on travel were minor.

The Story of the Flood of October 4-5

All tributary streams had receded rapidly in the four days following the flood crest on September 29 and were not much above normal levels when the second storm began on October 3. The French Broad River in its upper reaches was also back to near-normal stages but at Blantyre and below the stream had been back within its banks less than a day and water was standing in some low overbank areas when the heavy rain began on October 3.

Rosman--By Saturday, October 3, the residents of Rosman had about recovered from the effect of the flood on Tuesday. Homes had been cleaned up, basements had been pumped out and much of the damaged equipment had been repaired. Streets had been cleared and there was little evidence of the flood left when a hard rain began shortly before midnight. By noon on Sunday the rain at Rosman amounted to about 10 inches. Rain continued at a lesser rate until Monday morning. The river, at a 3-foot stage Saturday night, began a steady rise with the beginning of heavy rain. Bankfull stage of 8.00 feet was reached at 7:00 a. m. Sunday and a crest of 14.95 feet occurred at 1:45 p. m. This was 1.6 feet higher than the first flood and one foot higher than the 1916 flood at the gage. The river remained above bankfull stage until 5:00 a. m. on Monday.

All the homes and businesses that had been flooded on the previous Tuesday were again flooded on Sunday, this time to greater depths. U. S. Highway 178 was flooded and made impassable for a greater distance. More of the Southern Railway tracks in the town were put under water and two additional bents were damaged at the trestle in Rosman, although the suspended tracks did not wash out.

This time 37 homes or apartments and 2 trailers were flooded, with depths ranging up to 3.3 feet. A few people managed to raise furniture above flood levels, but many had heavy damage to furniture, clothing, books, carpets, and other personal items. Several families had worked hard following the first flood to clean and wax their hardwood floors and it appeared that there would be little permanent damage, but the second flood, with its greater depth and longer duration, caused extensive damage to all floors that were flooded. A church and its adjoining parsonage had heavy damage to floors and furnishings. There was additional damage to businesses affected in the first flood and appreciable damage at a restaurant and a grocery which had not been flooded before. The water surrounded, but did not enter, some 20 other homes and businesses. A large hole was scoured out at a street intersection in the lower part of town and there was other damage to streets and driveways.

The greatest damage at Rosman occurred at the Gloucester Lumber Company, located on the right bank of the French Broad River in the upper end of town. Flood waters poured through the plant area where thousands of board-feet of hardwood lumber was stacked. A large amount of lumber was washed away, and much of the remaining lumber was stained by the flood waters and had to be down-graded. At a power substation downstream from the lumber firm, flood waters did not reach the electrical equipment, but there was damage to the grounds and fence.

The rescue squads were again active in the flood area and worked long hours assisting the flood victims and directing traffic. The Red Cross and the Salvation Army assisted in providing shelter and giving aid to the affected families.

Forks of the French Broad--Upstream from Rosman the North and West Forks of the French Broad River rose to great heights, flooding highways and damaging bridges. Several slides occurred blocking or partially blocking highways. One large slide on the highway which follows North Fork blocked the road for several days and residents of the Balsam Grove community and workers at the Rosman Data Acquisition Facility of NASA had to make long detours.

The Mitchell-Bissell Company, manufacturers of formed wire fabrications for the textile industry and located on West Fork French Broad River about one mile above its mouth, had water to a 3-inch depth in their building. Water outside

the plant building rose one foot above floor level and damage would have been much greater if water in the plant had reached that depth. Drift and debris partially blocked a concrete culvert which carries West Fork under U. S. Highway 64 just upstream from the plant and flood water poured over the highway over a length of 500 feet and flowed into the plant area. Downstream from the plant a section of the highway was undercut and an underground telephone cable was broken. Farther downstream a small saw mill was flooded and a building containing a grocery store and cafe was undermined and toppled into the river. Near the confluence of West Fork and North Fork French Broad River another small sawmill was damaged by the flood water.

The October 4 floods were severe also on Middle Fork and East Fork of French Broad River. On Middle Fork a culvert under U. S. Highway 178 was partially blocked, putting water over the road. Traffic was affected by the washing and scour on secondary roads and by the washing out or damaging of bridges. Traffic between Rosman and the communities in the East Fork watershed was disrupted for most of a week when the East Fork Road was severely scoured by the high-velocity overflow.

Brevard--The development at Brevard is mostly located well back from the French Broad flood plain and the town escapes major damage from floods on the river, but there were effects on installations located at the edge of the flood plain and along the tributaries which flow through the town and on the highways which serve the area.

Upstream from Brevard, where grading had been done for an auto race track, French Broad River overflow carried away fill material.

Water was over U. S. Highway 276 which crosses the river south of Brevard, effectively cutting off the town from that direction. All other main-river bridges in the vicinity of Brevard were out of service for similar periods. Overflow from the river flooded the small airport near U. S. Highway 276 at Brevard, including the hangars, but all planes had been moved to high ground in advance of the flood. Water was 3 feet deep in a sewage pumping station near the airport, but no damage resulted.

In the North Brevard section the river completely flooded a drive-in theater, covering all the speakers, rising 4 feet deep in the ticket booth and 6 feet

deep in the building housing projection equipment and the concessions. Public utility construction forces, installing steel towers to replace wood poles of a transmission line where it crosses the flood plain in the North Brevard section, had several pieces of construction equipment flooded.

In Brevard, King Creek washed out one low bridge, overflowed a road crossing the flood plain below Brevard College, and damaged a motel when bank cutting undermined a corner of the building and caused a power pole to topple onto the roof of the motel. Tucker Creek overflowed U. S. Highway 64 to shallow depths for a short time, but did not stop traffic. Flood waters surrounded an oil bulk plant and some trailers, but damage was light. Nicholson Creek caused considerable damage when it went out of banks upstream from U. S. Highway 64 flooding several trailers and a garage. One expensive trailer was declared a complete loss by insurance company adjusters. Water was almost 3 feet deep in the garage, flooding two automobiles and equipment.

Pisgah Forest--Backwater from French Broad River was over Old U. S. Highway 64 where it crosses the Davidson River flood plain at Pisgah Forest. A trailer park and sales agency on Old U. S. Highway 64 west of Pisgah Forest was flooded and water was 8 feet deep in the Olin Mathieson Chemical Corporation Pumping Station on French Broad River just upstream from the mouth of Davidson River, with damage to some equipment.

Davidson River reached the highest stage since 1928, but damages were not great except where affected by the backwater from French Broad River near Old U. S. Highway 64. Five houses and a trailer along this highway were flooded by backwater. Four residences along the right bank of Davidson River downstream from the Olin Mathieson Plant, and above the effect of backwater, were flooded to shallow depths.

Upper River--The water was within banks only about 24 hours at Blantyre when overflow began for the second time shortly before noon on October 4. Overflow at this point, representative of a large part of the French Broad River in Transylvania and Henderson Counties, continued for about $4\frac{1}{2}$ days, making a total of 8 days the river was out of banks in a period of 9 days. The farm and horticultural crops flooded in the first rise were inundated again, this time to a 4-foot greater depth. Other fields were affected which had escaped damage in the first flood.

Primary and secondary roads and the tracks of the Toxaway Line of the Southern Railway were again overflowed, this time to greater depths, with the consequent disruptions of traffic. All schools were closed in Transylvania County on October 6 and 7 and in Henderson County on October 6.

Little River--Roads which cross the flood plain of Little River at Mile 1.2, 2.6, and 3.6 were overflowed. There was heavy damage to the road surface and fill at two crossings. Crop land was overflowed, and some crops were knocked down by high velocities. There was appreciable damage to land by scour or by deposits of sand and gravel.

Boylston Creek--Secondary roads and bottomlands were overflowed but the flood effects were not great except where flooding was prolonged due to backwater from the French Broad River.

Mills River--In the Mills River basin, traffic was affected on some roads by the overflow. Crops had been mostly harvested and there was little effect on land or property.

Mud Creek--On Mud Creek and on some of its tributaries the channel slopes are flatter than those found on most of the tributary streams in the upper French Broad River basin. Consequently, the recession following the first flood was slower and these streams were still near bankfull when the second storm began on October 3. By daylight on Sunday, October 4, overflow had begun along Mud Creek, Bat Fork, Devils Fork, and Clear Creek. By evening the flood had ended on some of the steeper streams in the Mud Creek basin, but out-of-bank flow continued for two days on the lower reaches of Mud Creek, Devils Fork, and Bat Fork. Roads and bridges were overtopped throughout the basin. Travel was affected for several days where there was damage to the bridges or bridge approaches. Problems of this nature occurred on Mud Creek at the North Main Street bridge in lower Hendersonville, at the Crail Farm Road above Hendersonville, and at several places on Clear Creek.

Water overflowed the main line tracks of the Asheville-Spartanburg Division of the Southern Railway where they cross the flood plain of Mud Creek at Naples. A section of fill was washed out and a culvert was damaged, halting rail traffic for three days, at a heavy cost to the railroad in loss of business and the added expense involved in rerouting trains.

Most farm and truck crops had been harvested prior to the floods, but there were still appreciable losses to the agricultural interests. Pastures and cover crops throughout the flood area were reduced in value by the overflow due to the effect of sediment deposits. On Mud Creek above Hendersonville gladioli plantings which were still in the field were affected and there was heavy scouring of land. At Balfour overflow from Mud Creek entered 5 houses to shallow depths and surrounded a pump station at Hendersonville's new sewage treatment plant.

On Clear Creek a man lost his life when his car was swept away as he attempted to cross the stream where a bridge and both approaches were under water.

Hendersonville--The story of the flood in the Mud Creek basin is found in a recount of the effects at Hendersonville, which suffered the most damaging flood in its history. Large developments on the flood plain were hard hit despite all efforts to protect materials and buildings from flood damage.

By 8:00 a. m. Sunday, October 4, Mud Creek had overflowed its bank above U. S. Highway 25 bridge at the south side of Hendersonville. Water soon began flowing across the highway and through part of an extensive development. About the same time overbank flow was beginning where U. S. Highway 64 crosses the flood plain east of the downtown Hendersonville area, also the site of numerous developments.

Owners and operators of many of the businesses in the flood plain began taking measures learned in the past to prevent or reduce flood damage. Stocks and supplies were moved to higher elevations, electric motors and other easily transported items were removed, power services were disconnected, and door openings were sandbagged. Many of these measures proved to be inadequate as the flood eventually rose above any level previously experienced.

By noon water was over U. S. Highways 25 and 176 to a depth sufficient to halt automobile traffic and had spread out to form a lake some 1200 feet wide. Trucks continued over these highways until about 2:00 p. m. The heavy waves which were set up by large trucks as they moved through the flood waters to a large extent thwarted the damage prevention efforts and intensified the damage at roadside businesses. The flood crest came in the Highway 25-176 vicinity at 4:30 p. m. At that time some 46 businesses or commercial firms were flooded, with water a foot or more deep in most and as much as 5 feet over the floor at some locations.

The situation was similar along U. S. Highway 64 where water rose 3 feet over the floor of bridges over Mud Creek, Bat Fork, and Devils Fork. The common overflow of the three streams extended for a width of about 1200 feet. Motor traffic was stopped before noon on Sunday and did not resume until Monday morning. Radio Station WHKP went off the air Sunday morning and was out of operation until Wednesday. Water rose nearly 4 feet deep in the studio and transmitter building. The County Welfare offices and four business firms in this same vicinity were flooded.

In the vicinity of Wilmouth Avenue, 10th Avenue and Beech Street, 16 families were forced from their homes.

Backwater from Mud Creek, combined with heavy flow from Britton Creek, flooded an area in the Druid Hills section. Motor traffic was disrupted for about an hour, a 10-unit motel, a greenhouse and two other buildings were flooded. Water entered basements at a dairy, a restaurant, and six homes and threatened a newly built medical center.

Civil Defense personnel and the Hendersonville Rescue Squad mobilized to help the flood victims. Approximately 110 persons were evacuated.

Cane Creek--The flood was not serious in the Cane Creek watershed. There were short periods when traffic was halted and there was some damage to agriculture, and to roads and bridges.

Asheville--The first flood peaked just under the bankfull stage at midnight on October 1. The river fell slowly during the next two days and was about three feet below bankfull when the second rise began early on October 4, some 12 hours after heavy rain had begun in the upper watershed. By noon Sunday the river had reached a bankfull stage of 8 feet at Asheville. The river continued to rise at the rate of 0.2 to 0.3 foot per hour through Sunday and Monday to a crest of 12.70 feet shortly after midnight Monday, October 5. The Swannanoa River had crested one foot under bankfull stage at 3:00 p.m. Sunday and the peak discharge from Hominy Creek had reached Asheville a few hours later. There was local flooding Sunday morning on Sweeten Creek, which flows through the Biltmore business district where it joins Swannanoa River.

The first effects of the flood at Asheville were felt as overflow from the French Broad River got into Riverside Drive at the Southern Railway bridge

early Sunday afternoon. By 5:00 p.m. water was over Amboy Road upstream from Carrier Bridge, closing the road to traffic. Backwater from the French Broad River soon caused overflow of Meadow Road on the right bank of Swannanoa River just above the mouth. Meadow Road is part of the by-pass, which normally handles all the north-south and east-west truck traffic around the Asheville business district. Water was over the truck route at several places along Lyman Street and Riverside Drive, which follow the right bank of French Broad River. It was Wednesday morning before the route was again open to traffic.

The slow rate of rise observed on French Broad River and the fact that there was no flooding of consequence along the Swannanoa River lulled many owners of riverfront property into a false sense of security and there were few efforts made to protect goods and property until the flood was already well advanced. By then access to many buildings was impossible by car or truck.

At the Hicks Corporation, a two-day battle was fought to keep the waters of the French Broad River from a large heat-treating furnace. At the flood crest water was a few inches below the main plant floor levels, but was nearly three feet above the level of a recessed floor on which the furnace rests. Sandbags were used to hold back the water and pumps were used to handle seepage into the area. At the height of the effort eight pumps were in use. Five days of production was lost at the plant before operations could be returned to normal.

Water entered numerous warehouses, causing heavy damage to textile materials, paper products, building materials, and other stored goods. Oil bulk plants and coal yard were affected and there was heavy damage at a by-products plant and at several used materials yards.

The telephone company had crews in the flood area removing expensive equipment in advance of the flood and maintaining service to important points by temporary means while the flood was in progress.

It was the morning of Wednesday, October 7, before the river was fully within its banks at Asheville, and the city's most damaging flood since 1940 had become history. The most recent flood of any significance was that of April 1957, when the river was out of its banks less than a day and the flood crest was some 2.4 feet lower than in this flood.

Sweeten Creek--On Sunday, October 4, heavy rains over the 5.8-square-mile area of Sweeten Creek caused the creek to flood a part of the business and commercial development in the Biltmore section of Asheville. Traffic was interrupted and 16 firms were affected to varying degrees.

Water overflowed Sweeten Creek Road, U. S. Highway 25-A, in the Biltmore Plaza area and for a distance of 0.8 mile upstream. The greatest damage was in the Plaza area, where poor street drainage aggravated the problem and caused the water to be 3 feet deep at one point. Shallow flooding caused heavy damage to rugs and furniture in a furniture store and to precision tools at a tool supply firm. A drive-in restaurant had water 18 inches over the floor.

Marshall--The crest stage resulting from the September storm was 6.65 feet on the French Broad River at the Marshall stream gage, safely under the bankfull stage of 10 feet. The second crest occurred four days later at a stage of 10.49 feet. Although the river was out of its banks for 27 hours, the community was not greatly affected.

When news reached Marshall on Sunday October 4, of the floods at Rosman and Hendersonville and about the rising river at Asheville, the flood-conscious townspeople began moving merchandise and equipment to higher floors or to sites out of the flood plain. Some 250 tons of surplus foodstuffs were taken from one warehouse on the flood plain to a building on higher ground. Sandbags were readied for blocking of doors and windows of flood plain structures.

Similar precautions were taken at the Marshall School on Blennerhassett Island in French Broad River. People in low-lying houses were warned to be prepared for evacuation, and the courthouse and churches were opened to be ready to provide shelter for the flood victims.

Merchants and town officials stood by Sunday night, all day Monday, and Monday night, watching the slow rise of the river. By 11 p.m. Monday water was over the road in the Rollins community upstream from Marshall and had backed through drains into the parking lot at the French Broad Electric Cooperative office and into Gudger Street between Upper Bridge Street and Lower Bridge Street. Water entered several basements along this street, but with the precautions taken, damage was held to a minimum.

At the Marshall School water was over the playground and flooded the gymnasium and the home economics department on the lower floor of the school. Water surrounded the town's sewage disposal plant, under construction on the lower end of Blennerhassett Island, but caused no damage. By daylight Tuesday morning the French Broad River at Marshall was back within its banks.

Hot Springs--Residents of Hot Springs also were apprehensive when reports were heard of the flood upstream and they watched the river anxiously. The rise passed Hot Springs without the river reaching flood height. Spring Creek, which passes through the town, caused no damage either.

Newspaper Stories and Photographs

Selected newspaper stories about the floods are reproduced in Appendix E. Appendix F contains representative photographs taken during the floods of September-October 1964.

FLOOD DAMAGES

Table 5 is a summary of flood damages in the upper French Broad River basin. Tables 17 through 21 appearing in Appendix D are summaries of the damage in the vicinity of the communities of Rosman, Brevard-Pisgah Forest, Hendersonville, Asheville, and Marshall, respectively. In all the tables an amount equal to approximately 10 percent of the direct losses has been added to cover intangible losses.

The floods of September and October 1964 probably rate as the most damaging in the upper French Broad River basin since 1916. The direct losses in the commercial category are estimated at \$515,000 and to industries, \$252,000. The damage to residences amounted to \$87,000 and to utilities a nearly equal amount, \$82,000. Municipal losses are placed at \$18,500. The total flood losses in the six communities affected was \$954,500. Agricultural losses amounted to \$623,500. Total damage in the upper French Broad River basin from the flood of September-October 1964 is estimated at \$1,805,000.

Rosman

The summary of damages, Table 17, lists the combined damages for the two floods at Rosman as \$120,000. The second flood occurred before a survey of damages from the first flood could be undertaken, hence no separation of damages could be made between the two floods.

At the Mitchell-Bissell Company plant on West Fork French Broad River above Rosman, $1\frac{1}{2}$ days' production was lost because of the floods and the total of 15 hours of power service interruption which resulted from the floods. Electric motors were damaged and cold-rolled steel wire, used in the plant's operations, was rusted where water reached it. Water was just 3 inches deep in the plant although it was one foot deep outside the building. Deeper flooding in the plant would have caused severe damage to machinery, electrical equipment, and stock.

At the Gloucester Lumber Company lumber was either washed away or reduced in value by water stains. Roads and buildings in the plant area were damaged.

Losses in the commercial category amounted to \$15,300, with damage to three grocery stores, a restaurant, a self-service laundry, a recreation center, two vacant buildings, a church, and a small airfield.

Four apartment buildings, 23 residences, and two trailers had damages totaling \$29,900. Water in a telephone service building and damage to lines and poles amounted to \$2,800 for the local telephone company.

Brevard and Pisgah Forest

The September flood caused no damages of consequence in the Brevard-Pisgah Forest area. The flood on October 4-5 caused damages amounting to \$80,600. A summary of damage appears in Table 18.

In Brevard damage to a drive-in theater, a mobile homes sales agency, a motor court, a radio shop, a bulk oil plant, a heating firm, and an airfield amounted to \$22,900. Heavy damage to 26 trailers in the Brevard and North Brevard area was \$37,000 and to ten homes and a trailer at Pisgah Forest was \$4,500.

At the Olin Mathieson Chemical Corporation plant damage to fencing along Davidson River, minor erosion on the dike which protects the plant, the cost of reconditioning the water pumping plant on French Broad River, plus the small

loss of payroll to employees due to travel problems, amounted to \$3,800. There was no loss of production at the plant and no preventive measures were required because of the floods.

Hendersonville

The flood damages in Hendersonville, summarized in Table 19, amounted to \$192,500. Affected was one industrial firm, 63 business and commercial establishments, some 35 residences, public utilities, and city property.

In the heavily built-up business community on the right-bank flood plain of Mud Creek centered on U. S. Highways 25 and 176, 36 business firms and four residences were damaged. A dairy bar and three restaurants were hard hit by the flooding which ranged from 1 to $2\frac{1}{2}$ feet in these buildings. The losses ranged from \$2,500 to \$5,500. Two to ten days of business were lost because of the flood. At a 12-lane bowling alley, water under the alleys did \$10,200 damage. Water 6 inches deeper would have increased the damage sixfold, according to the owner. Water which was 31 inches deep in a dry cleaning plant caused nine days' loss of business and damage to equipment, supplies and garments, for an aggregate loss of \$6,500. Damage prevention work at a welding shop saved an estimated \$10,000 in loss, but the 28 inches of water in the building at the height of the flood did \$5,800 damage to heavy welding machines and supplies in storage and in business lost because of the flood.

On the opposite bank of Mud Creek, and along Wash Creek near its junction with Mud Creek, ten firms were affected. At a shopping center, which was under construction, the water lacked a few inches of reaching the floor level of the buildings, but there was damage to the parking area and to construction equipment.

Water was over the Old Spartanburg Highway where it crosses the broad flood plain of Mud Creek at Mile 8.8. Buildings and storage areas were flooded at a farm equipment sales firm, an industrial maintenance company, a construction firm, and a garage. A labor dormitory, used to house migrant farm workers, was flooded. It was necessary to remove the occupants by using Rescue Squad boats and there was damage to furniture, bedding, and clothing.

Farther downstream, near the Southern Railway bridge, six houses and an animal shelter were flooded. Water rose 5 feet in the office of a truck sales and service agency on Elm Street and flooded two houses nearby.

Water was 3 feet deep on U. S. Highway 64 where it crosses the flood plains of Mud Creek, Bat Fork, and Devils Fork. At Radio Station WHKP water was nearly 4 feet deep on the floors of the studios, offices, and the transmitter room, with very heavy damage. The station operators used heavy-duty heater units to bake out the waterlogged equipment and, by round-the-clock efforts, were able to put the station back on the air three days after the flood.

Water was about 4 feet deep in the Henderson County welfare offices on the downstream side of U. S. Highway 64. There was heavy damage to floors, furniture, and equipment. Other firms in the flood plain at this point included a dry goods store, a service station, a farm equipment sales agency, and a concrete block plant. All had heavy damage from the flood.

At U. S. Highway 25 in the Druid Hills section, water which was 4 feet deep in the basement of a dairy plant damaged motors and stored foodstuff and caused a 3-day loss of business for the restaurant and dairy bar which is part of the firm's operation. Water in a ten-unit motel damaged rugs, television sets, and other furniture, and caused a 10-day loss of business.

Business operators contacted during the flood damage investigation, who had taken measures to reduce the flood damage by moving goods or barricading doors, provided estimates of the savings they felt such measures had produced. These estimates totaled approximately \$80,000 in the Hendersonville area.

Asheville

Table 20 summarizes the flood losses at Asheville, a total of \$557,400. Affected by the flood were six industries and 62 business or commercial firms. Sixteen of the business firms were those affected by the local flooding on Sweeten Creek, not directly related to the flood on the main river. These losses totaled \$12,500. The losses to industries amounted to \$157,000, and to all commercial establishments \$278,300. The losses to the public utilities, almost all sustained by the telephone company, were \$65,400.

At the Hicks Corporation plant, loss of production, damage to equipment and buildings, and the cost of damage prevention work were estimated at \$56,000. At a furniture plant nearby, damage to buildings, a boiler, stockpiled coal, machinery, and material in production amounted to \$50,000. Losses to two other industries that had materials stored in warehouses in the flood plain were \$30,000 and \$20,000, respectively.

Firms in the commercial category which were affected included ten used auto parts or auto sales firms, four restaurants, two bulk oil plants, five building material suppliers, five warehouses or distributing firms, two processors of used materials, three coal or fuel oil dealers, two sand and gravel plants, a stockyard, a rendering plant, a cold storage plant, and a motor speedway. Losses to the warehouses and the goods stored in warehouses was the largest item, totaling \$89,000. Materials damaged included foam rubber, cotton, other textiles, food products, and specialty items. Three firms that process textile and metal scrap had losses to material affected by the flood which amounted to \$50,000. Two were directly affected by French Broad River overflow; the other was on the lower Swannanoa River where the flooding resulted from backwater from the main river. Water over used autos and auto parts at ten yards in the flood plain did damages amounting to \$26,300. At the motor speedway, fencing and part of the race track was washed out and the public address system was damaged.

In the Sweeten Creek area most of the buildings had only a few inches of water over their floors and the damage consisted mostly of the cost of cleaning up after the flood. At the drive-in restaurant, damage to the floors and refrigeration motors and compressors amounted to \$1,000. Damage at the furniture store amounted to \$5,000 and at the tool supply firm, \$3,000.

Marshall

Flood damages were light at Marshall, totaling \$4,100. A summary of the damages appears in Table 21. This does not include the cost of the extensive flood damage prevention measures which were taken except where there would have been flood damage had the precautions not been taken. The cost of moving goods from the buildings which were not reached by the flood is considered part of the intangible loss.

Damage to the three bulk oil plants affected is estimated at \$1,300. A large part of this was the added expense of trucking oil products from Asheville suppliers to serve local customers when water in the plant area or over the access road prevented serving them from the local supplies. At the Marshall School the cost of moving materials and cleaning up after the flood plus the damage to ground and buildings amounted to \$1,000.

Damage Classifications

Agricultural Damages--The total agricultural damage, summarized in Table 5, was estimated at \$623,500. Damages to gladioli amounted to \$281,000 and a nearly equal amount, \$282,000, was suffered by other crops. Field improvements were damaged to an estimated total of \$32,000. Land damage amounted to \$28,500. Agricultural damages would have been much greater had the floods occurred a month or so earlier. A flood in August 1961, which was 4 to 6 feet lower than the October 1964 flood, caused an estimated damage of \$1,171,000 to crops alone. The total estimated losses for the August 1961 flood in the upper French Broad River basin was \$1,380,000.

Following the floods, weather conditions were favorable for drying out the corn which had been inundated. Some of the grain corn was harvested with only a moderate reduction in the feed value. In other cases, where the corn had been under water for longer periods, the reduction in value was 50 percent or greater. Much of this was harvested and put into cribs with the moisture content still high and, in some cases, mold showing on the corn, in hopes that the needed additional drying would take place in the cribs.

There were wide variations also in the losses to silage corn. This is normally harvested and put into vertical or trench silos while still green. Where flooding depths were great or prolonged, the corn was killed; by the time the fields could be worked after the floods, the corn had become too dry for harvesting in the usual manner. To salvage what they could, some farmers added moisture as the corn was chopped and put into storage. The nutrient value was reduced appreciably below that of silage prepared in the normal way; estimates of the reduction in value ranged from "minor" to "50 percent or better" by the farmers interviewed.

Truck Crops--Most truck crops had been harvested, and there were very few places in the upper French Broad area where losses occurred.

Gladioli--Four firms producing gladioli had losses which totaled \$281,000, mostly in bulbs damaged by the extended overflow.

Pineland Farms, which began operations in 1964 on the French Broad River near Brevard, lost 7,000 dozen flowers in the first flood. Overflow, which totaled $4\frac{1}{2}$ days for the two floods, reduced the growth of 20 acres of merchantable bulbs.

Mr. A. P. Thomas, who had 265 acres in gladioli on French Broad River near Penrose and on Little River, lost 65 acres of flowers. Bulbs on another 100 acres were under water for a total of seven days. The water carried away 5,000 wooden trays stacked in the field preparatory to harvesting the bulbs. In addition, there was damage to land by heavy washing and by deposits of sand and gravel.

The Flower Express Company at Hendersonville had 175 acres in gladioli near the mouth of Mills River which was flooded by French Broad River. Bulbs were still in the ground on 150 acres which were inundated from 5 to 7 days. The bulbs were not a complete loss but were reduced in size and value.

Mr. A. M. Foster had 64 acres in gladioli on Mud Creek above Hendersonville. The flood caused the loss of 5 acres of flowers and the bulbs from 6 acres, and also carried away 250 trays of recently dug bulbs.

Highway Damages--Damages to highways in the upper French Broad River basin amounted to \$94,000. Damage was limited to Transylvania, Henderson, and Buncombe Counties.

In Transylvania County the damage to bridges was \$39,000 and to highways \$21,600, according to data supplied by the State Highway Department. On East Fork French Broad River, where the heaviest damage occurred, a bridge was washed out, another heavily damaged, and approach fills damaged at four others. The pavement and road-bed of East Fork Road was damaged at one point. On North Fork French Broad a bridge above Balsam Grove was washed out, and an approach was washed out at another site. On Middle Fork a small bridge was washed away and there was damage to approaches at several sites. On West Fork, U. S. Highway 64 just above Rosman was undercut and part of the pavement lost. At Patton Bridge near Pisgah Forest, a 50-foot section of the road was washed out. The high velocities at the bridge opening and through the washed-out section caused heavy cutting in the farm land on both banks of the river below the bridge. There was washing of fills and gravel road surfaces on secondary roads throughout the county.

In Henderson County, damage to roads amounted to \$10,600 and to bridges \$8,000. Two culverts were washed out, one on Cane Creek near Fletcher and one on a tributary of King Creek south of Hendersonville. There was washing and scour of roads and bridge approaches in many parts of the county. Records of the State Highway Department list damage of this type at 27 locations in the Tennessee Valley portion of Henderson County. U. S. Highway 64 was affected by a ditch

blockage west of Hendersonville near Horseshoe, and N. C. Highway 191 was affected by the washout of a culvert at a small stream north of Mills River.

In Buncombe County a \$5,000 loss occurred when Avery Creek washed out a small bridge west of Skyland. Damage to roads amounted to \$9,800, distributed among 10 locations. The French Broad River damaged the shoulders and surface of N. C. Highway 191 near Bent Creek and washed a secondary road near Glenn Bridge. There was damage to roads or bridge approaches on upper Cane Creek and on its tributaries Gap Creek and Brush Creek, on Robinson Creek near Skyland, on South Hominy Creek west of Asheville, and on Sandymush Creek and Flat Creek below Asheville.

Railroad Damages--Damages sustained by the Southern Railway amounted to \$133,000. A large part of this was loss of revenue occasioned by a three-day interruption to traffic resulting from the washout of the track of the Asheville-Spartanburg Division by Mud Creek near Naples. Cost of repairs to the track and a culvert at this site was \$17,700. On the Toxaway Line, damage to a trestle at Rosman amounted to \$1,800, and damages to the roadbed and track on the line amounted to \$1,400. There was a 2-day interruption to operations on the line, but no appreciable loss of business resulted from this.

Utility Damages--Damage to a retaining wall and an access road at the Cascade Power Company dam on Little River amounted to \$1,700.

III.

FLOODS OF SEPTEMBER-OCTOBER 1964

IN THE

UPPER LITTLE TENNESSEE RIVER BASIN



FLOODS OF SEPTEMBER-OCTOBER 1964
IN THE UPPER LITTLE TENNESSEE RIVER BASIN

INTRODUCTION

The heavy rains on October 4-5, 1964, along the southeastern rim of the Tennessee Valley caused highly damaging floods in the upper portion of the Little Tennessee River basin. Conditions for high runoff were created by an earlier heavy storm, on September 28-30, which caused overbank stages on the Little Tennessee River above Franklin, North Carolina, and produced bankfull stages on the upper Tuckasegee River and on other upper tributaries of Little Tennessee River.

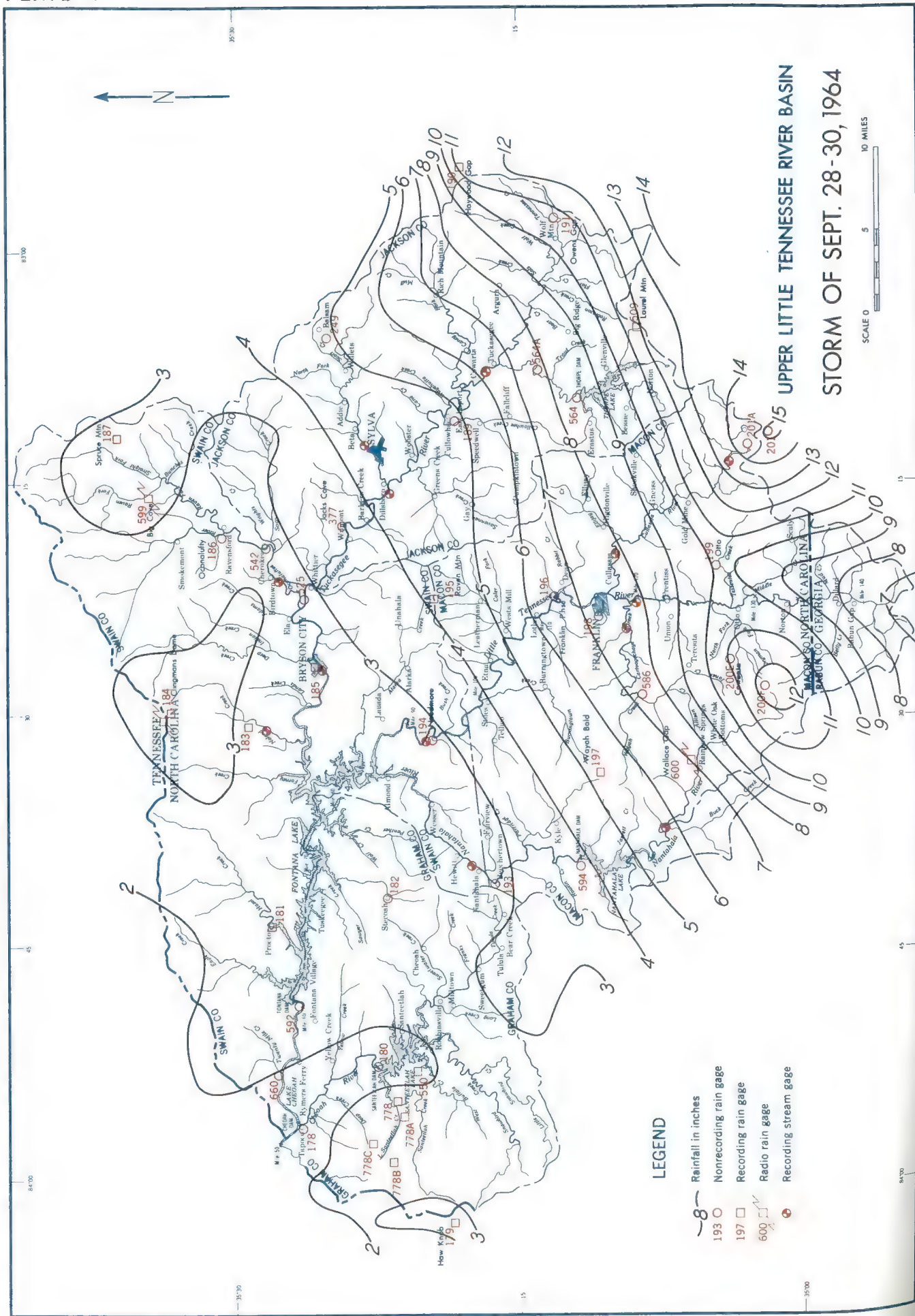
The more favorable runoff conditions during the October 4-5 storm produced serious flooding on all headwater streams. Little Tennessee River at and above Franklin exceeded the highest previously known flood, that of October 1898. Cullasaja River was slightly higher than the flood of August 1940. Tuckasegee River was the highest since 1940.

Commercial and industrial firms in the flood plain at Franklin were especially hard hit, with total losses of nearly half a million dollars. There was heavy flood damage to roads and bridges throughout the storm area. Crops, rural property, and homes were affected and traffic was disrupted. Total flood damages for the Little Tennessee River basin have been estimated at \$816,000.

STORM RAINFALL

Prior Precipitation

Precipitation over the upper Little Tennessee River basin above Fontana Dam was above normal during the two months prior to September 1964. The average for July was 6.7 inches, 0.6 inch above normal and for August 8.6 inches, 3.6 inches above normal. September prior to the storm of September 28-30 was relatively dry and, had it not been for this storm, would have been one of the driest Septembers of record in this area. The average for September 1-27 was 0.8 inch or 25 percent of the 3.4-inch normal.



Storm of September 28-30

The isohyetal map on Plate 4 shows the distribution of rainfall over the upper Little Tennessee River basin during the period September 28-30. This storm caused flood stages on some of the streams with headwaters along the Blue Ridge Divide. The storm also saturated the ground in advance of the equally intense storm of October 4-5.

The heaviest precipitation occurred along a band about 15 miles wide paralleling the Blue Ridge Divide. Several stations reported amounts in excess of 10 inches, the maximum being 15.08 inches at the U. S. Weather Bureau station near Highlands. Downstream from the band of heavy rainfall, the amounts decreased rapidly to an average of about 2 inches along the Tennessee-North Carolina state line. Intense rain began along the Blue Ridge around 8 to 10 p.m. on September 28. In the period of some 60 hours up to observation time on the morning of October 1, rainfall averaged 9.4 inches over the Little Tennessee River basin above Franklin, an area of 295 square miles. Averages of flood-producing rainfall over selected watershed subdivisions in the upper Little Tennessee River basin are shown in Table 7. on page 59.

Plate 5 shows cumulative precipitation at selected recording stations in the upper Little Tennessee River basin for the period September 27 to October 6. The chart shows that the flood-producing rain fell in two distinct intensity periods. The first and more intense fell from around 8 to 10 p.m. on September 28 to around 1 to 2 p.m. on September 29. A second period of less intense rainfall continued until around 2 to 4 p.m. on September 30. Rainfall averaging about 0.5 inch fell along the Blue Ridge Divide on September 28 prior to the beginning of the flood-producing storm.

Storm of October 4-5

Light showers occurred during the period between the end of the September 28-30 storm and the beginning of the storm of October 4-5. The average rainfall over the upper Little Tennessee River basin above Fontana Dam during this 3-day period was 0.3 inch. These light showers served to keep the ground wet prior to the storm of October 4-5.

The isohyetal map on Plate 6 shows the distribution of rainfall over the upper Little Tennessee River basin for the storm of October 4-5.

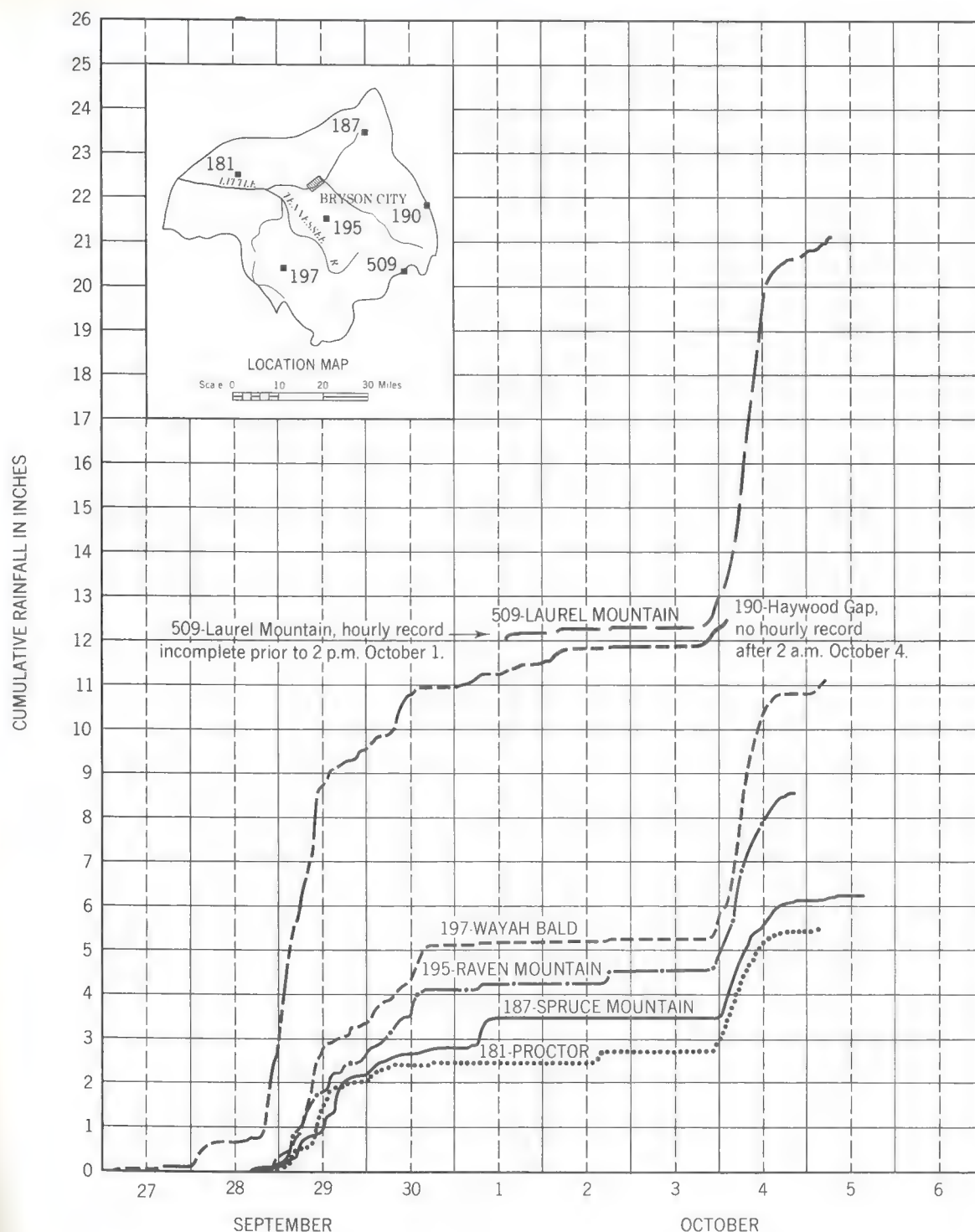
The October 4-5 storm, like the storm of September 28-30, was heaviest over the Blue Ridge Divide region. The maximum rainfall amount was 10.79 inches at Highlands. Although the maximum rainfall for the October storm was less than for the September storm, the width of the band of heavier rainfall was greater for the October storm. The configuration of the isohyets for the two storms is quite similar. October 4-5 rainfall, like the September 28-30 rainfall, decreased in a downstream direction from the Blue Ridge Divide and averaged about 3.0 inches along the Tennessee-North Carolina state line. Intense rain began to fall at all stations in the area at 10 to 11 p.m. on October 3, and up to observation time on October 5 an average of 8.6 inches had fallen over the Little Tennessee River basin above Franklin. October 4-5 storm averages over selected watershed subdivisions in the upper Little Tennessee River basin are shown in Table 7 on page 59.

Plate 5 shows cumulative rainfall at selected recording gages for the storm of October 4-5 and gives a comparison with the September 28-30 storm. In the area of greatest rainfall the storm was divided into an initial period of high-intensity rain beginning about 10 p.m. on October 3 and continuing to about noon on October 4, followed by a period of light rain until mid-morning of October 5. The period of intense rainfall for the October 4-5 storm was 15 hours compared with 18 hours for the September 28-30 storm.

Total Rainfall, September 28 to October 5

Total rainfall during the 8-day period September 28 to October 5 ranged up to a maximum of 25.97 inches at the USWB station near Highlands. The TVA station at Highlands reported a total of 25.57 inches. Seven stations located in the upper Little Tennessee River area reported totals in excess of 20 inches. The distribution of the total rainfall for the period September 28 to October 5 is shown on the frontispiece map. The red shading on the map delineates the upper Little Tennessee River area. The average rainfall above Franklin for the total storm was 18.3 inches.

Daily rainfall and storm totals are listed in Table 15 in Appendix B for stations located in the upper Little Tennessee River basin.



All graphs plotted to Eastern Standard Time.
Dashed vertical line indicates 12 noon.

CUMULATIVE RAINFALL
STORMS OF SEPTEMBER-OCTOBER 1964
AT SELECTED STATIONS
IN UPPER LITTLE TENNESSEE RIVER BASIN



	Rainfall in inches
	Nonrecording rain gage
	Recording rain gage
	Radio rain gage
	Recording stream gage

FLOOD RUNOFF

Peak Stages and Discharges

Moderate to high peak stages occurred on streams in the upper portion of the Little Tennessee River basin on September 29. A second flood, on October 4, produced high peak flows with record stages on some streams. Table 6 lists peak stages and discharges for the two floods at stream gages in the upper Little Tennessee River basin and compares these data with the previous maximum known floods.

Of the 13 gaging stations on unregulated streams, only three stations recorded peak discharges exceeding 100 cubic feet per second per square mile during the October 4-5 flood. The highest unit flow of 240 cubic feet per second per square mile occurred on Cullasaja River at Highlands where the drainage area is 14.9 square miles.

Values of the coefficient "K" in the flood formula, peak discharge = $K \sqrt{\text{drainage area}}$, were relatively low. The maximum was 1,820 for the crest of October 4 on the Cullasaja River at Cullasaja.

Gage heights and discharges observed at selected gaging stations in the upper Little Tennessee River basin are shown on Plates 20 to 29 in Appendix C. Hydrographs are shown for only those stations where the peak stages exceeded bankfull stage for either one or both of the floods.

Runoff-Rainfall Ratios

The average rainfall and total runoff values were determined for the two storms at selected gage locations in the basin. These values are shown in Table 7, together with the runoff-rainfall ratios in percent. Runoff as discussed in the report is the total volume of runoff from the rainfall of the two storms which produced the floods. It includes both surface and ground-water runoff resulting from the flood-producing rainfall. Both the prior and post-storm runoff have been separated from these totals.

Runoff during the September 29-30 flood ranged from 6 to 27 percent of the rainfall and during the October 4-5 flood from 23 to 53 percent. Although the flood-producing rainfall of the two storms was approximately equal in amount and intensity, the October 4-5 storm, which fell on wet ground, produced the

TABLE 6
PEAK STAGES AND DISCHARGES FOR STREAMS
IN THE
UPPER LITTLE TENNESSEE RIVER BASIN IN NORTH CAROLINA

Stream	Station	Drainage Area sq. mi.	Flood of September 29-30, 1964			Flood of October 4-5, 1964			Previous Maximum Known Flood			
			Peak Stage feet	Discharge		Peak Stage feet	Discharge		Peak Stage feet	Discharge		
				Amount cfs	Per Sq. Mi. cfs		Amount cfs	Per Sq. Mi. cfs		Amount cfs	Per Sq. Mi. cfs	
Little Tennessee River	near Prentiss	140	9.61	3,980	28	17.30(a)	12,200	87	Oct. 1898	15	-	-
Little Tennessee River	at Needmore	436	7.35	8,620	20	12.87	22,100	51	Oct. 1898	13	-	-
Cullasaja River	at Highlands	14.9	4.36	1,600	107	7.19	3,580	240	Aug. 1940	9.35	5,100	342
Cullasaja River	at Cullasaja	86.5	13.48	4,700	54	21.45	16,900	195	Aug. 1940	20.83	16,500	191
Cartoogechaye Creek	near Franklin	57.1	6.71	1,170	21	12.96	4,720	83	June 1949	15.6	7,000	123
Coon Creek	near Franklin (c)	1.60	-	-	-	5.75	256	160	Mar. 1963	4.83	152	95
Tuckasegee River	at Tuckasegee	143	9.12	6,690	47	14.36	13,800	97	Aug. 1940	21.1	40,800	285
Tuckasegee River	at Dillsboro	347	9.01	7,630	22	15.61	25,300	73	Aug. 1940	21.96	52,600	151
Tuckasegee River	at Bryson City	655	6.17	7,780	12	11.44	23,200	35	May 1840	20	-	-
Scott Creek	above Sylva	50.7	4.99	686	14	7.54	1,940	38	Aug. 1940	8.6	3,200	63
Oconaluftee River	at Birdtown	184	2.47	1,020	6	4.68	3,440	19	Jan. 1946	12.0	15,000	82
Noland Creek	near Bryson City	13.8	2.24	123	9	2.84	256	19	Aug. 1940	4.87	1,530	111
Nantahala River	near Rainbow Springs	51.9	4.30	1,760	34	8.46	5,130	99	June 1949	9.70	6,300	121
Nantahala River	at Nantahala	144	3.43	832(b)	-	4.89	2,190(b)	-	Feb. 1946	8.15	7,510(b)	-

(a) Affected by backwater from Cartoogechaye Creek.

(b) Regulated by Nantahala Dam.

(c) Partial record station.

Discharge data are provisional and subject to revision.

IN THE

UPPER LITTLE TENNESSEE RIVER BASIN IN NORTH CAROLINA

Stream	Station(a)	Drainage Area sq. mi.	Storm of September 28-30			Storm of October 4-5		
			Average Rainfall inches	Flood Runoff inches	Runoff- Rainfall Ratio percent	Average Rainfall inches	Flood Runoff inches	Runoff- Rainfall Ratio percent
Little Tennessee River	near Prentiss	140	9.6	1.8	19	9.2	4.4	48
Little Tennessee River	at Needmore	436	8.0	1.3	16	7.6	2.6	34
Cullasaja River	at Highlands	14.9	13.7	3.7	27	10.2	5.3	52
Cullasaja River	at Cullasaja	86.5	10.3	2.1	20	8.6	4.6	53
Cartoogechaye Creek	near Franklin	57.1	7.5	0.9	12	7.0	2.8	40
Tuckasegee River	at Tuckasegee	143	9.6	0.8	8	7.8	2.1	27
Tuckasegee River	at Dillsboro	347	7.2	0.6	8	6.2	2.0	32
Tuckasegee River	at Bryson City	655	5.2	0.5	10	4.9	1.2	24
Scott Creek	above Sylva	50.7	4.8	0.4	8	4.6	1.2	26
Oconaluftee River	at Birdtown	184	2.8	0.3	11	3.1	0.8	26
Noland Creek	near Bryson City	13.8	3.2	0.2	6	3.0	0.7	23
Nantahala River	near Rainbow Springs	51.9	8.3	1.5	18	7.8	3.6	46

(a) A small portion of the upper Little Tennessee River watershed lies in Georgia; however, all of the gaging stations listed are located in North Carolina.

greatest runoff. The maximum ratio of runoff to rainfall was 53 percent and occurred on Cullasaja River at Cullasaja for the October 4-5 flood. The maximum ratio for the September 29-30 flood was 27 percent for the Cullasaja River at Highlands. The runoff-rainfall ratios for the October 4-5 flood are comparable with those for a number of other large floods occurring in the summer season. The very low ratios for the September 28-29 storm reflect the very dry conditions which prevailed when that storm began.

Comparison with Past Floods

Little Tennessee River--Little Tennessee River at Prentiss, 2.5 miles above Franklin, reached a stage of 9.61 feet on September 29. This was 0.6 foot above the bankfull stage and comparable with a number of floods that have occurred in the last 12 years. However, at this same location the October 4 flood was the highest since streamflow records began in the vicinity of Franklin in 1929 and was 2 feet higher than the highest known flood, which occurred in October 1898.

On the Little Tennessee River at Needmore, 20 miles below Franklin, the crest stage on October 4 was 12.87 feet, about equal to the stage reached in 1898.

At the peak of the October flood, Cartoogechaye Creek at Franklin was 2.6 feet lower than a flood in June 1949.

Cullasaja River--The flood of September 29 reached a crest of 13.48 feet at Cullasaja, the highest at that station since 1952. On October 4 crest stage was 21.45 feet, 0.6 foot above the 1940 flood. At the Highlands stream gage, near the head of Cullasaja River, the crest on October 4 was 2.2 feet under the peak of the August 1940 flood. The peak runoff rate at the Highlands gage was 240 cubic feet per second per square mile, the highest for any gaging station in the area. At the Cullasaja gage the rate was 196 cubic feet per second per square mile, next highest in order of magnitude.

Tuckasegee River--Tuckasegee River at the Tuckasegee stream gage reached a stage of 9.12 feet on September 29, the highest in recent years but not a serious flood. The crest on October 4 was 14.36 feet, the highest stage since August 30, 1940, but 6.7 feet under the crest of that flood.

At the stream gage at Dillsboro the October 4 crest was 15.61 feet, 6.3 feet lower than the 1940 flood. At Bryson City the Tuckasegee River crested at 11.44 feet, 7.6 feet under the 1940 flood and 0.1 foot lower than a flood on April 7, 1964.

Scott Creek at Sylva was 1.1 feet under the 1940 flood, which had been equaled in the April 1964 flood. The flood was a minor one on Oconaluftee River.

Nantahala River--Nantahala River at the Rainbow Springs, above Nantahala Reservoir, had a crest of 8.46 feet, 1.2 feet lower than the June 1949 flood. The flood on lower Nantahala River was controlled by regulation at Nantahala Reservoir.

STORY OF THE FLOODS

The October 4, 1964, floods in the upper Little Tennessee River basin are outstanding because of record stages and because of severe damage at Franklin. Although high stages occurred on the Tuckasegee River, the October 4 flood was less noteworthy because of the greater and much more destructive flood which occurred in August 1940.

Regulation was a factor in the floods on Tuckasegee and Nantahala rivers. Thorpe Dam on West Fork Tuckasegee River, although normally not operated for flood control, had storage available and retained most of the flood flow from its 37 square miles of drainage area. The four small power dams on East Fork Tuckasegee River have only a small amount of storage and consequently have a very minor effect upon floods. However, since the storm was centered in the extreme headwaters, the effect of such storage as was available was more noticeable than would have been the case with a wider distribution of rainfall. Below Nantahala Reservoir the flood on Nantahala River showed the sizable effect of storage at that point. There is no storage on Little Tennessee River and the flood on that stream occurred under natural flow conditions.

Little Tennessee River

The flood on September 29 overflowed the low-lying bottoms upstream from Franklin but since this type of flooding is frequent it caused little concern.

The Little Tennessee River began rising on the morning of October 4, but little concern was felt since there was nothing to indicate that the flood would be any different from those experienced so many times in the past. However, before noon there was concern as the river reached bankfull and began to spill over into low-lying areas. By this time the local radio station was broadcasting warnings of possible higher stages based upon reports received from upstream. The concern was intensified when it was rumored that the upstream Highlands Municipal Dam had failed.

Owners and operators of the many businesses in the flood plain began taking measures to keep water from buildings and to move articles to higher elevations. Lack of time and failure to anticipate the height to which the flood would rise made many of these measures futile. Within nine hours the business section was under 3 to 5 feet of water.

Mr. Troy Shook, manager of the Big Dollar Supermarket on the right-bank flood plain 300 feet upstream from U. S. Highway 64 & 441 bridge, reported that water entered the store parking area just before noon. At 1:30 p.m. it reached the floor of the store. By 7:30 p.m. the water stood 32 inches deep in the store. Mr. T. H. Callaham, Jr., owner of the nearby DeSoto Trail Restaurant, excused his employees after noon. The river rose so rapidly that flood preventive measures were impossible. The water reached a depth of 47 inches in this restaurant.

The Peak-Line Furniture Company plant above Phillips bridge is located on the left-bank flood plain. An attempt was made to floodproof the plant by covering doors and windows with plywood and pitch. This held the water out for a time, but the plywood failed eventually under the weight of water which reached a depth of nearly 6 feet over the plant floor.

Upstream from Franklin water blocked traffic on U. S. Highway 441 for several hours and was over secondary roads for longer periods. There was broad overflow of croplands and pastures. Roads were damaged by scour. One bridge approach was washed out and others were damaged. A small private earth dam on Middle Creek was overtopped and washed out.

Downstream from Franklin secondary roads and narrow bottoms were overflowed, but the effects there were relatively minor compared with the upstream areas.

Cullasaja River--A small earth dam near Highlands was lost on September 29 when the spillway proved inadequate. Water from the $1\frac{1}{2}$ -acre lake caused no damage as it moved downstream.

On October 4 two other small private dams were lost in the Cullasaja River basin. Damage resulting from the failures was minor. There were false reports in Franklin that the larger Highlands Municipal Dam had failed, but this structure came through both floods without damage.

A number of houses in bottomlands near the Cullasaja community were flooded. A large pile of debris collected at the U. S. Highway 64 bridge over the Cullasaja River at Cullasaja. State highway crews removed it to prevent loss of the bridge. The steel bridge at Mile 1.01 was blocked by high water, and secondary roads were inundated for varying periods.

Cartoogechaye Creek--Cartoogechaye Creek overflowed its banks and flooded bottoms, but there was little damage. Flooding of roads and interference with travel were minor.

Tuckasegee River

The rainfall of September 28-30 caused no flooding of consequence on the Tuckasegee River. However, the October 3-4 rainfall produced serious flooding on the Tuckasegee River and its tributaries. The first indication that serious flooding was inevitable came in mid-morning of October 4. At noon state and area Civil Defense Headquarters and the Jackson County Board of Commissioners declared a state of emergency. Civil Defense personnel were put in charge and assumed responsibility for the welfare of the people. Civil Defense headquarters were set up in the Sylva Fire Station building. Five telephone lines were installed to maintain communications with all parts of the county. Rescue units were stationed at several locations in the county to direct traffic and evacuate people where threatened by the rising floodwaters. More than 400 persons were involved in the volunteer work. The Sylva radio station abandoned its regular programming to make reports of flood conditions with special attention to driving conditions. It made appeals for housing for the families who had to leave their homes. The Civil Defense activities continued for 12 hours, until midnight October 4, when the state of emergency was declared at an end.

In the headwaters of the Tuckasegee River in the vicinity of the communities of Glenville, Tuckasegee, and East Laport, concern was felt first for the roads and bridges as the river continued its rise. The floodwaters overflowed N. C. Highway 107 both upstream and downstream from East Laport, cutting off all vehicular traffic and effectively isolating the community for some hours. Water overtopped a state-maintained footbridge at Tuckasegee and flooded a recently opened wood products firm there. The Nantahala Power and Light Company stationed crews at all its dams on the forks of Tuckasegee River to keep gates clear of drift and debris and to be available for emergency operations.

The community of Cullowhee was virtually isolated when floodwaters blocked N. C. Highway 107 at Ashe bridge north of the town and near Dicks Gap at the south. Many Western Carolina College students, returning from weekend visits, were delayed for several hours on their return to Cullowhee. A bridge washout and road damage stopped local traffic to the rural communities east of Cullowhee. All occupants of a trailer park were forced from their quarters, and two houses were evacuated in the town.

At Sylva the channel which carries Scott Creek through the town was able to pass the flood on that stream without damage or serious inconvenience. At Dillsboro, where Scott Creek joins Tuckasegee River, streets were flooded. Waters of Tuckasegee River flooded some tourist cabins at Dillsboro and entered the grounds and buildings of a construction firm below the town. Access to homes was cut off when secondary roads were flooded.

There was no general flooding downstream from Dillsboro, but overflow at scattered points caused damage and inconvenience. At Whittier a new furniture factory just starting production was flooded, and water surrounded a church and the post office. The highway bridge over Tuckasegee River at Whittier was being replaced at the time of the flood. A temporary footbridge erected for use of the inhabitants during the construction period was carried away by the floodwaters. For a short period the part of the town located on the left bank was isolated when water blocked the access roads on that side of the river.

At Bryson City, residents were alerted to the flood and the Swain County Rescue Squad was standing by, but overflow was minor and no emergency measures were required.

Newspaper Stories and Photographs

Selected newspaper stories about the floods are reproduced in Appendix E. Appendix F contains representative photographs taken during and after the flood of October 4-5.

FLOOD DAMAGES

As soon after the flood as practical, investigations were begun to appraise the damages which resulted, with particular emphasis upon the hard-hit Franklin area. Owners of industrial, commercial, and residential properties were interviewed and contacts were made with officials of the North Carolina Highway Department, the public utilities, and town and county offices. Farmers and agricultural agents were interviewed regarding crop and land damages. Damages were estimated upon the basis of these contacts and by careful observation of conditions in the field. An amount equal to approximately 10 percent of the total tangible damages was added to cover the intangible losses caused by the flood. Losses of this kind would include the loss of business and payroll to businesses and persons outside the flood area due to transportation difficulties, the added cost of travel, and similar losses of an indirect nature.

Table 8 is a summary of the damages for the upper Little Tennessee and Tuckasegee River basins, and Table 9 summarizes the damages in the vicinity of Franklin. These show that the total of all losses attributable to the flood amounted to \$545,000 at Franklin, and for the entire upper Little Tennessee River basin amounted to \$816,000. Tables 22 and 24 in Appendix D are tabulations giving additional details on the flood losses.

Damage to commercial establishments, the largest category of loss, amounted to \$342,300. Industrial losses were \$208,600. Highway losses, next in order of magnitude, were \$105,000. Residential losses were \$41,700. Agricultural losses were a relatively small \$12,800, attributable to the fact that the flood came after most crops had been gathered. Corn still in the field was matured and withstood the shallow to moderate overflow with little damage in most cases.

TABLE 8
SUMMARY OF DAMAGES
UPPER LITTLE TENNESSEE AND TUCKASEGEE RIVER BASINS
 Flood of October 4-5, 1964

Industrial

Little Tennessee River - 5 firms affected	\$155,600	
Tuckasegee River - 2 firms	<u>53,000</u>	\$208,600

Commercial

Little Tennessee River - 46 firms	335,800	
Tuckasegee River - 3 firms	<u>6,500</u>	342,300

Residential

Little Tennessee River - 2 houses, 1 trailer	800	
Cullasaja River - 20 houses	24,600	
Tuckasegee River - 3 houses, 12 trailers	<u>16,300</u>	41,700

Agricultural

Little Tennessee River	10,550	
Cullasaja River	950	
Tuckasegee River	<u>1,300</u>	12,800

Rural Property

Cullasaja River - 3 small dams		15,000
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Highway

Macon County	67,000	
Swain County	12,000	
Jackson County	<u>26,000</u>	105,000

Railroad

Tuckasegee River		10,000
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Utility

Little Tennessee River	1,600	
Tuckasegee River	<u>1,000</u>	2,600

Municipal, Other

Little Tennessee River	1,900	
Cullasaja River	800	
Cartoogechaye Creek	200	
Tuckasegee River	<u>500</u>	<u>3,400</u>

Total tangible damage		\$741,400
Estimated intangible damage		<u>74,600</u>
Total, all damage		\$816,000

TABLE 9

SUMMARY OF DAMAGESVICINITY OF FRANKLIN, NORTH CAROLINA

Flood of October 4, 1964

<u>Industrial</u>		<u>Residential</u>	
Little Tennessee River		Little Tennessee River	
5 Firms affected		2 Residences	\$ 500
		1 Trailer	300
			<u>\$ 800</u>
<u>Commercial</u>		<u>Utility</u>	
Little Tennessee River		Little Tennessee River	
2 Supermarkets	\$92,500	Telephone services	600
2 Appliance stores	76,000	Electric services	1,000
2 Bulk oil plants	31,500		<u>1,600</u>
2 LP gas bulk plants	7,150		
2 Restaurants	22,940		
1 Auto agency	20,000		
2 Feed and supply stores	10,260		
1 Auto parts firm	1,000		
7 Service stations	14,650		
4 Dry cleaners or laundries	10,600		
1 Bowling alley	15,500		
2 Motels	13,000		
2 Auto repair shops	3,100		
3 Rock and gem shops	5,700		
1 Contractor	6,000		
5 Real estate offices	1,750		
1 Woodworking shop	2,000		
1 Airport	1,000		
1 Blacksmith Shop	350		
1 Machine shop	250		
1 Vacant building	250		
1 Hardware firm	200		
1 Heating firm	100		
	<u>335,800</u>		
		Streets, sewers, water system	1,000
		Rescue, relief activities	600
		Food, sanitation inspections	300
			<u>1,900</u>
		Cartoogechaye Creek	
		County fair grounds	200
			<u>2,100</u>
		Total tangible damage	\$495,900
		Estimated intangible damage	<u>49,100</u>
		Total, all damage	<u>\$545,000</u>

Franklin

This was the most damaging flood ever experienced by this county seat town. The main business district is on high ground west of the Little Tennessee River flood plain, but a fast-growing business and commercial area has built up in recent years on the flood plain along heavily traveled U. S. Highway 64 & 441. Water up to 6 feet in depth flowed around and through the closely set buildings. The velocity was sufficient to cut away asphalt-paved parking areas in some cases and greatly hampered salvage and protective measures which were begun when the seriousness of the flood became obvious.

When water broke over the protective dike at a furniture plant in the upstream part of Franklin, the entire plant was flooded to a depth of almost 6 feet. Damage occurred to furniture in production, machinery, office equipment, and the building and grounds. Four other industrial firms suffered relatively minor damage.

Altogether, 46 business or commercial establishments were affected. Two large supermarkets suffered almost complete loss of stock and severe damage to fixtures, buildings, and parking lots. Two home appliance stores had severe damage to refrigerators, stoves, television sets, and other stocked items. Two restaurants suffered heavy losses to fixtures and equipment. Two motels were flooded, with damage to floors, carpets, and furniture. Other firms affected included seven service stations, four dry cleaning or laundry plants, two bulk oil plants, two LP gas plants, two feed and supply stores, an automobile agency, an auto parts firm, three auto repair shops, five real estate offices, three rock and gem shops, a bowling alley, an airport, and a contractor's equipment area.

Little Tennessee River

Broad areas of fertile agricultural land border the Little Tennessee River upstream from Franklin. Flood overflow was widespread in this reach but the damage was moderate, because overflow velocities were low and because crops had matured and most had been harvested. The only crop still in the field was corn, mostly of the type being produced for silage. Water was around and even over the corn for a day or more in some cases, but the corn remained erect and was later harvested with some reduction in quality. Land scour was minor and there were only a few areas affected by deposits of sediment. Fences were clogged with debris, but in most cases were not knocked down. Highways were damaged by washing of fills and

gravel surfaces. A bridge approach was washed out at Prentiss and a small earth dam on Middle Creek was overtopped and washed out. This structure was about 75 feet long and 25 feet high and impounded a private lake of about 8 acres.

Below Franklin the Little Tennessee River passes through farm areas less subject to flooding than above the town. Some small fields of grain corn were flooded, but prompt harvesting after the flood cut losses to a small amount. Two footbridges were destroyed and there was damage and interruption to use of secondary roads.

Cullasaja River--A small dam near Highlands was washed out by the September 29 flood. An earth structure about 10 feet high and 100 feet long, the dam created a lake of about $1\frac{1}{2}$ acres on a small branch draining into Mill Creek. Failure occurred when water began washing around the side of a timber spillway section. Damage occurred at the spillway only, and the main part of the earth fill was left intact.

The flood on October 4 caused the failure of two small dams in the Cullasaja River basin. One dam, an earth structure located not far from the one which failed on September 29, was about 15 feet high and 50 feet long and formed a lake of 4 to 5 acres. It failed when a small saddle dam in the spillway channel washed out. The main dam was overtopped but was not seriously damaged because the lake level dropped sharply when the saddle dam washed out. The other dam was a part concrete, part earth-fill structure located just below U. S. Highway 64 on Buck Creek, near the community of Gniess. The earth section was overtopped and washed away and a masonry building just below the dam was heavily damaged. Three houses located in the 500-foot reach between the dam and the confluence of Buck Creek and Cullasaja River were not damaged.

Near Cullasaja a house was washed from its foundation and carried downstream to smash against the U. S. Highway 64 bridge. Two other houses were knocked from their foundations, with heavy damage to one of them. Another home was flooded to a depth of 5 feet. A 60-foot bridge on a secondary road near Gniess was washed out and a number of other bridges were damaged. Secondary roads were washed and scoured with consequent interruptions to travel. Land scour was widespread.

Cartoogechaye Creek--Damage was very light in the Cartoogechaye Creek drainage.

Total Damages--The total of all damages for the upper Little Tennessee River and its tributaries, exclusive of that at Franklin, amounted to \$143,900.

Tuckasegee River

The damage along Tuckasegee River and its tributaries amounted to \$126,000. Two industries received damages estimated at \$53,000. Bridges and highways were hard hit, with a loss of \$26,000. Railroad damage amounted to \$10,000 in loss of fill and ballast material. Commercial and residential damages were moderate and losses to agriculture were light. Table 23 in Appendix D is a tabulation listing the losses in the various categories.

IV.

FLOODS OF SEPTEMBER-OCTOBER 1964

IN THE

UPPER HIWASSEE RIVER BASIN

FLOODS OF SEPTEMBER-OCTOBER 1964

IN THE UPPER HIWASSEE RIVER BASIN

INTRODUCTION

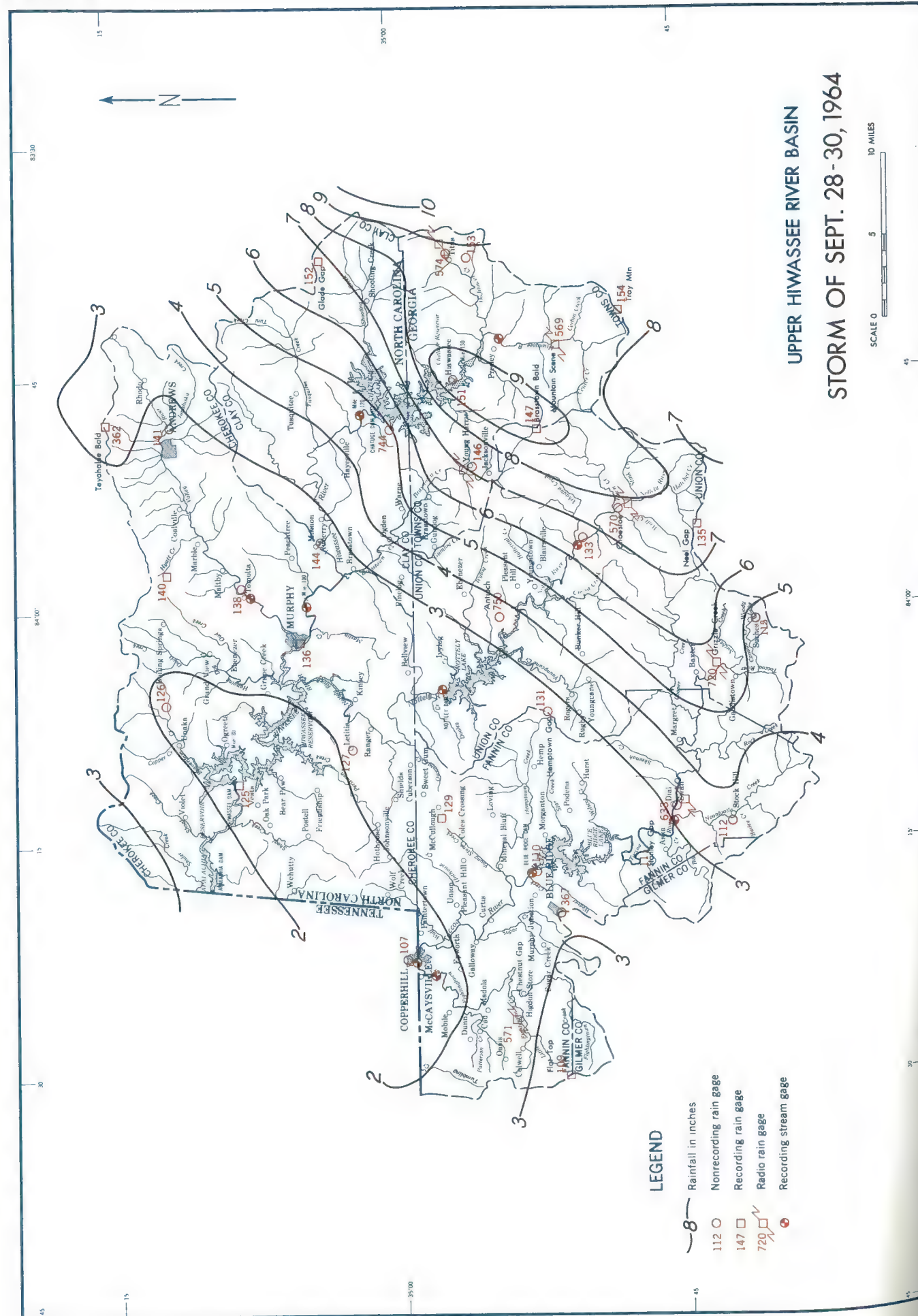
As the final week of September 1964 began, dry conditions had developed over the Hiwassee River basin. The ground was deficient in moisture and streams were at or near base-flow conditions when heavy rain began over the area on the 28th. Precipitation, which totaled 6 to 9 inches over the basin headwaters in the two-day period September 28-29, wiped out the month's rainfall deficiency and put streams near or above bankfull stages.

Although streams had receded, conditions were favorable for high runoff when the storm of October 4-5 hit the area. Rainfall averaged 6.3 inches for the Hiwassee River basin during this storm, and amounts ranged up to 11 inches in the headwaters along the Blue Ridge Divide. Flooding occurred on all streams in the upper part of the watershed and reached record proportions on Brasstown Creek, a tributary which joins Hiwassee River 7 miles above Murphy, North Carolina. Damage occurred to roads, bridges, crops, land, and rural property. The urban areas of McCaysville, Georgia, and Copperhill, Tennessee, were affected by the Toccoa-Ocoee River. Traffic was disrupted for several hours on some of the main highways and for longer periods on secondary roads. Schools were closed for periods up to three days. Flood damages have been estimated at \$118,500.

STORM RAINFALL

Prior Precipitation

Precipitation over the upper Hiwassee River basin including the Toccoa River basin was above normal during the two months prior to September 1964. The average for July over the Hiwassee River basin above Hiwassee Dam was 6.8 inches, 0.7 inch above normal, and for August 7.6 inches, 2.8 inches above normal. Averages over the Toccoa River watershed above Dial, Georgia, were 7.8 inches for July, 1.3 inches above normal, and 6.2 inches for August,



1.1 inches above normal. September prior to the storm of September 28-30 was very dry in these watersheds and, had it not been for the storm, would have been one of the driest Septembers on record in this basin. The average for September 1-27, 1964, over the upper Hiwassee River basin was 0.4 inch or 12 percent of the 3.4-inch normal.

Storm of September 28-30

The isohyetal map on Plate 7 shows the distribution of the September 28-30 rainfall over the upper Hiwassee River basin. The storm filled stream channels and saturated the ground in advance of a greater storm coming on October 4-5.

The heaviest precipitation occurred in the watershed above Chatuge and Nottely Dams. The maximum rainfall centered at Hiawasse, Georgia, where a total of 9.45 inches was reported. Downstream from the center of high rainfall the amounts decreased rapidly to an average of $1\frac{1}{2}$ to 2 inches in the vicinity of the Tennessee line. Intense rain began around 6 or 8 p.m. on September 28. In a period of some 62 hours up to observation time on the morning of October 1, rainfall averaged 7.9 inches over the Hiwassee River watershed above Chatuge Dam, an area of 189 square miles. Averages of flood-producing rainfall over selected watershed subdivisions in the upper Hiwassee River basin are shown in Table 12. on page 82.

Plate 8 shows cumulative hourly rainfall at selected recording gages in the upper Hiwassee River basin for the period September 27 to October 6.

Storm of October 4-5

During the interval from the end of the storm on September 30 to the beginning of the storm of October 4-5, light rainfall averaging less than one-half inch occurred over the watershed.

The isohyetal map on Plate 9 shows the distribution of rainfall over the upper Hiwassee River basin for the storm of October 4-5. Several supplemental rainfall catches were obtained in the Toccoa River area following the storm of October 4-5. These data were used to supplement rainfall station network records in developing the isohyetal map.

The October 4-5 storm was heaviest in the Georgia section of the upper Hiwassee River basin. The greatest storm totals were reported along the Blue

Ridge Divide, a maximum of 11.45 inches being recorded at Stanley Gap, Georgia, in the Toccoa River watershed. A recording gage located at Tray Mountain, on the divide south of Chatuge Reservoir, registered 11.11 inches. Rainfall decreased gradually in a downstream direction, ranging from about 4 to 6 inches along the Tennessee state line. Intense rain began to fall at all stations around 9 to 10 p. m. on October 3, and up to observation time on October 5 an average of 7.7 inches had fallen over the Hiwassee River basin above Chatuge Dam, and 8.1 inches over the Toccoa River basin above Dial, Georgia. October 4-5 rainfall averages over selected watershed subdivisions in the upper Hiwassee River basin are shown in Table 12.

Plate 8 shows cumulative rainfall at selected recording gages for the storms of October 4-5 and gives a comparison with the September 28-30 storm.

Total Rainfall, September 28 to October 5

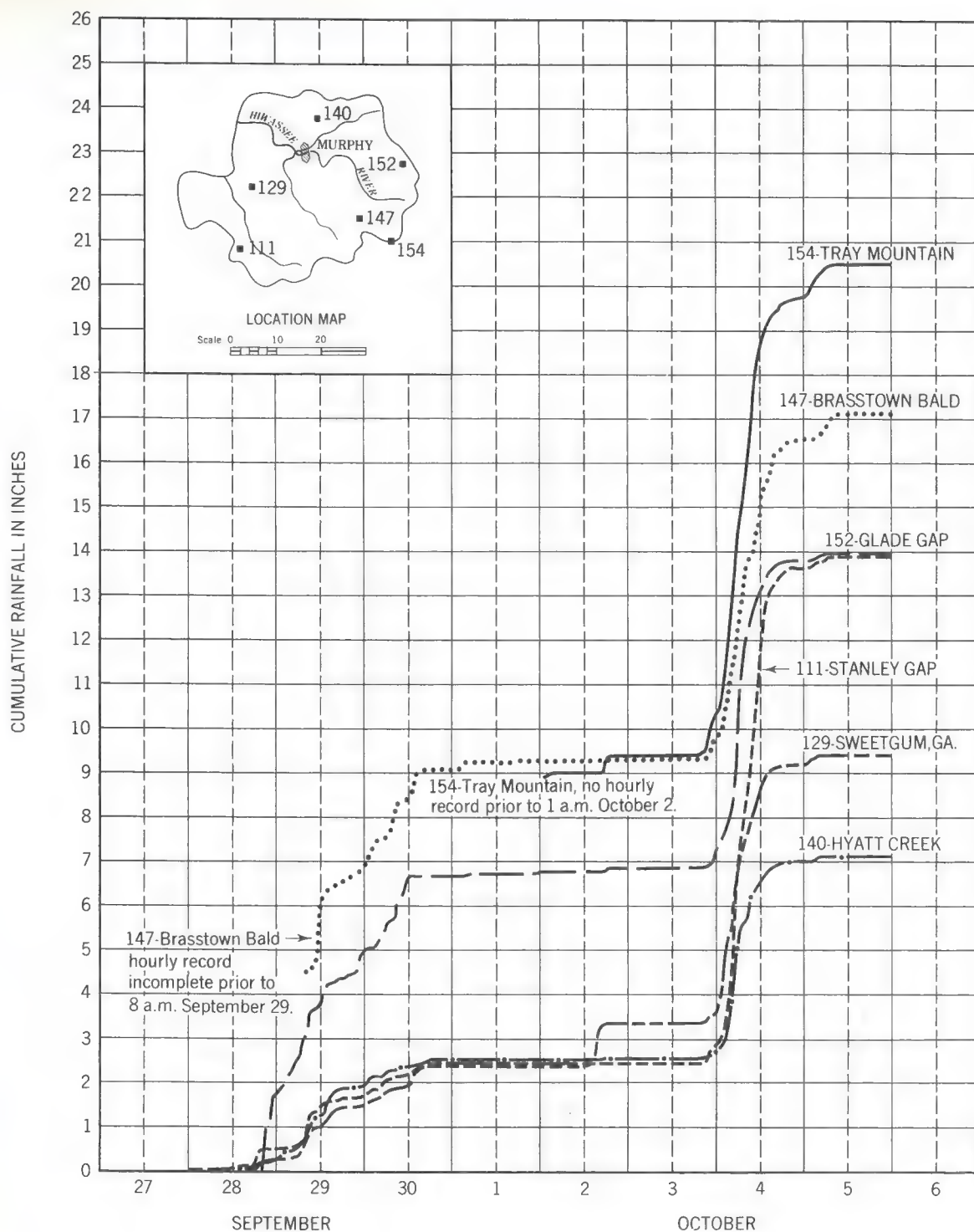
Total rainfall during the 8-day period September 28-October 5 ranged up to a maximum of 20.53 inches at Tray Mountain, Georgia. The greatest amount in the Toccoa River watershed was 13.92 inches at Stanley Gap, Georgia. The distribution of the total rainfall is shown on the frontispiece map. The red shading on the map delineates the upper Hiwassee River and Toccoa River watersheds. Rainfall over these watersheds averaged 11.9 inches during the total storm period.

Daily rainfall and storm totals are listed in Table 16 in Appendix B for stations located in the upper Hiwassee River basin.

FLOOD RUNOFF

Peak Stages and Discharges

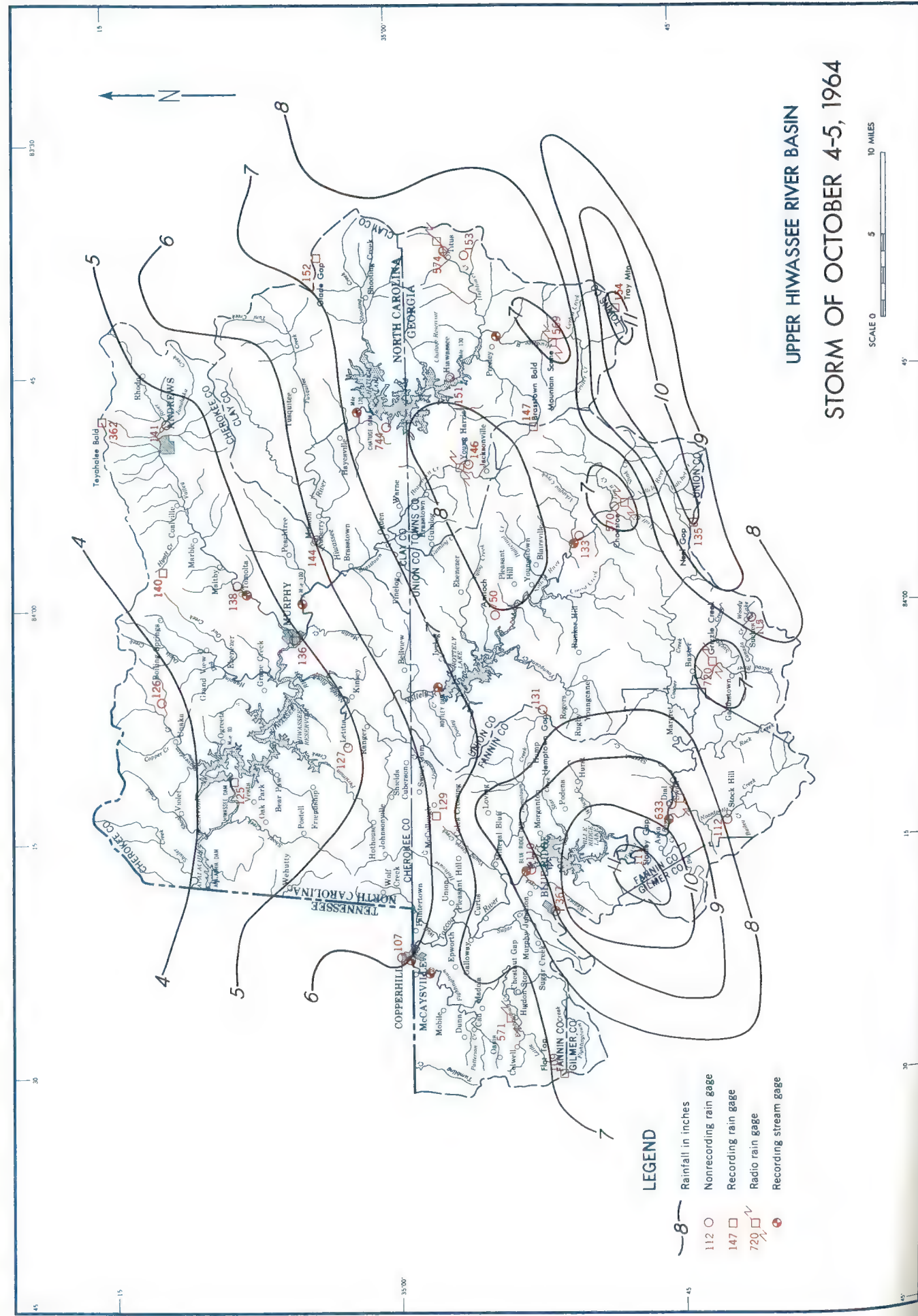
After the moderate rises resulting from the September 28-29 storm, streams of the area receded rapidly and were not much above seasonal normals when the second storm began late on October 3. Most streams rose slowly for the first five or six hours after this storm began, or until 3 or 4 a. m. on October 4, when runoff increased sharply. At this time streams began rising rapidly and continued to do so until crest stages were reached in midafternoon to early evening of October 4. Table 10 lists peak stages and discharges for the two floods at stream gages in the upper Hiwassee River basin and compares these data with the maximum previously known floods.



All graphs plotted to Eastern Standard Time.
Dashed vertical line indicates 12 noon.

CUMULATIVE RAINFALL STORMS OF SEPTEMBER-OCTOBER 1964 AT SELECTED STATIONS IN UPPER HIWASSEE RIVER BASIN

24403B



LEGEND

- 8— Rainfall in inches
- 112 ○ Nonrecording rain gage
- 147 □ Recording rain gage
- 720 □ Radio rain gage
- Recording stream gage

UPPER HIWASSEE RIVER BASIN
STORM OF OCTOBER 4-5, 1964

SCALE 0 5 10 MILES

TABLE 10
PEAK STAGES AND DISCHARGES FOR STREAMS

IN THE
UPPER HIWASSEE RIVER BASIN

Stream	Station	Drainage Area sq.mi.	Flood of September 29-30, 1964			Flood of October 4-5, 1964			Previous Maximum Known Flood			
			Peak Stage feet	Discharge		Peak Stage feet	Discharge		Peak Stage feet	Discharge		
				Amount cfs	Per Sq. Mi. cfs		Amount cfs	Per Sq. Mi. cfs		Amount cfs	Per Sq. Mi. cfs	
Hivawsee River	at Presley, Ga.	45.5	4.05	622	14	12.63	4,110	90	Mar. 1952	15.24	5,700	125
Hivawsee River	below Chatuge Dam, N. C.	190	5.27	1,480(a)	-	2.18	260(a)	-	Dec. 1942	8.00	3,040(a)	-
Hivawsee River	above Murphy, N. C.	406	5.65	3,030(b)	-	12.93	16,200(b)	-	Jan. 1957	12.56	15,300(b)	-
Shooting Creek	near Hayesville, N. C. (c)	37.6	-	-	-	8.54	5,100	136	June 1949	9.20	6,820	181
Valley River	at Tomotla, N. C.	104	3.12	460	4	8.17	2,370	23	Sept. 1898	21.2	20,000	192
Nottely River	near Blairsville, Ga.	74.8	5.99	1,690	23	16.28	7,950	106	Mar. 1952	16.78	8,500	114
Nottely River	at Nottely Dam, Ga.	215	4.90	1,810(d)	-	1.21	73(d)	-	May 1955	6.54	3,130(a)	-
South Shoal Creek	near Murphy, N. C. (e)	12.6	-	-	-	13.92	290	23	Jan. 1957	14.66	-	-
Toccoa River	near Dial, Ga.	177	4.45	2,040	12	10.78	10,100	57	Nov. 1906	18.5	28,000	158
Toccoa River	near Blue Ridge, Ga.	233	4.76	1,590(f)	-	5.81	2,260(f)	-	Nov. 1906	-	34,000	146
Ocoee River	at Copperhill, Tenn.	352	3.82	1,950(g)	-	9.42	13,700(g)	-	Nov. 1906	18.5	35,000	100
Fightingtown Creek	at McCaysville, Ga.	70.9	-	-	-	9.42	3,490	49	Mar. 1951	11.92	5,420	77

- (a) Regulated by Chatuge Dam.
 (b) Partly regulated by Chatuge Dam.
 (c) Inactive gaging station.
 (d) Regulated by Nottely Dam.
 (e) Partial-record station.
 (f) Regulated by Blue Ridge Dam.
 (g) Partly regulated by Blue Ridge Dam.

Discharge data are provisional and subject to revision.

Of the seven gaging stations on unregulated streams listed in Table 10, two stations recorded peak discharges exceeding a rate of 100 cubic feet per second per square mile of drainage area during the October 4-5 flood. The maximum discharge per square mile for the gaging station sites was 136 cubic feet per second at the site of an inactive USGS gage on Shooting Creek near Hayesville, North Carolina. This discharge occurred on October 4. Peak discharges did not exceed 23 cubic feet per second per square mile during the September flood.

The U.S. Geological Survey made indirect measurements of peak discharge of the October 4 flood at six sites on small streams in the basin. The results of these measurements are shown in Table 11. For comparative purposes, data shown in Table 11 include peak discharges for the flood of May 31, 1959, which was also large on these streams. Because the drainage areas are generally smaller at these sites, the unit flows tend to be higher than the flows shown in Table 10. The highest unit flow of 353 cubic feet per second per square mile occurred on Butternut Creek near Blairsville, Georgia, where the drainage area is only 0.98 square mile.

Values of the coefficient "K" in the flood formula, peak discharge = $K\sqrt{\text{drainage area}}$, were low at all sites. The maximum was 950 for the crest of October 4 on Brasstown Creek near Young Harris, Georgia.

Stage and discharge hydrographs are shown on Plates 30 to 34 in Appendix C for selected gaging stations on unregulated streams located in the upper Hiwassee River basin. Hydrograph plates are shown for only those stations where the peak stages exceeded bankfull stage for one or both of the floods.

Runoff-Rainfall Ratios

The average rainfall and total runoff values together with the runoff-rainfall ratios are shown in Table 12 for selected gages on unregulated streams in the basin. Runoff as discussed in the report is the total volume of runoff from the rainfall of the two storms which produced the floods. It includes both surface and ground-water runoff resulting from the flood-producing rainfall. Both the prior and post-storm runoff have been separated from these totals.

Runoff during the September 29-30 flood was very low, ranging from 4 to 9 percent of the rainfall, reflecting the very dry conditions prior to the storm. During the October 4-5 flood the ratios ranged from 17 to 36 percent, generally comparable with those for other large summer floods on the streams.

TABLE 11

UPPER HIWASSEE RIVER BASIN
INDIRECT MEASUREMENTS OF PEAK DISCHARGE
FLOODS OF MAY 31, 1959, AND OCTOBER 4, 1964

Stream and Location	Latitude	Longitude	Drainage Area sq. mi.	Discharge	
				May 31, 1959 cfs	Oct. 4, 1964 cfs
Bitter Creek at county road, 2 miles southwest of Young Harris, Ga.	34°54'	83°52'	4.78	840	1,500
Brasstown Creek at U. S. Highway 76, 1.8 miles southwest of Young Harris, Ga.	34°55'	83°52'	12.6	2,280	3,360
Brasstown Creek at Ga. Highway 66, 0.7 mile northwest of Young Harris, Ga.	34°56'	83°51'	20.3	3,990	4,030
Butternut Creek at U. S. Highway 76, 2.8 miles northeast of Blairsville, Ga.	34°54'	83°55'	0.98	249	346
Brasstown Creek at Ga. Highway 66, at Welch, Ga.	34°58'	83°52'	34.5	4,560	5,320
Butternut Creek at U. S. Highway 19, 0.6 mile west of Blairsville, Ga.	34°52'	83°58'	11.1	1,730	2,980

Data furnished by U. S. Geological Survey.

TABLE 12
RAINFALL AND RUNOFF VOLUMES FOR SELECTED STREAMS

IN THE UPPER HIWASSEE RIVER BASIN					
<u>Stream</u>	<u>Station</u>	<u>Drainage Area</u> sq. mi.	<u>Average Rainfall</u> inches	<u>Flood Runoff</u> inches	<u>Runoff- Rainfall Ratio</u> percent
<u>Storm of September 28-30</u>					
Hiwassee River	at Presley, Ga.	45.5	8.8	0.5	6
Valley River	at Tomotla, N. C.	104	2.8	0.1	4
Nottley River	near Blairsville, Ga.	74.8	7.8	0.7	9
Toccoa River	near Dial, Ga.	177	4.4	0.3	7
Fightingtown Creek	at McCaysville, Ga.	70.9	2.8	-	-
<u>Storm of October 4-5</u>					
Hiwassee River	at Presley, Ga.	45.5	8.1	2.4	30
Valley River	at Tomotla, N. C.	104	4.7	0.8	17
Nottley River	near Blairsville, Ga.	74.8	8.0	2.9	36
Toccoa River	near Dial, Ga.	177	8.1	1.8	22
Fightingtown Creek	at McCaysville, Ga.	70.9	6.8	1.4	21

Comparison with Past Floods

Hiwassee River--The Hiwassee River at the stream gage at Presley, Georgia, was above advisory stage of 10 feet for seven hours October 4. The peak stage of 12.64 feet was the highest since March 1952 when a peak stage of 15.24 feet was reached, the highest since the beginning of records in 1942.

Hiwassee River above Murphy crested at 12.93 feet on October 4, 1.9 feet above advisory stage and the highest since records began in 1939. There was no discharge from Chatuge Dam during the flood and the flood was produced by local inflow below the dam, particularly from Brasstown Creek.

Brasstown Creek--There is no stream gage on Brasstown Creek, but high water marks and interviews with local residents show that the October 4 flood exceeded all floods known in a period going back at least 40 or 50 years.

A flood on May 31, 1959, was investigated by TVA field personnel. The October 1964 flood surpassed the 1959 flood by 1 to 6½ feet.

Nottely River--The October flood on the Nottely River near Blairsville crested at 16.30 feet, 5.3 feet above advisory stage and 0.48 foot lower than the flood of March 1952. Runoff was high on Butternut Creek, a tributary of Nottely River.

There was no discharge at Nottely Dam during the flood and the reservoir filled about 18 feet with the flood runoff.

Toccoa-Ocoee River--The October 4 crest stage at the Toccoa River at Dial stream gage was 10.87 feet, 1.9 feet above the advisory stage and 0.3 foot below the flood of March 11, 1952, which was the highest at the gage since records began in 1913. A flood in 1898 reached a stage of 14 feet according to high water marks.

At Copperhill the flood crested at 9.48 feet, 0.35 foot under the March 29, 1951, flood and some 8 feet lower than the flood of November 1906. Blue Ridge Dam was not discharging during the major part of the flood and most of the rise at Copperhill was due to local runoff from the area below the dam.

Fightingtown Creek peaked at 9.44 feet, 1.6 feet under the advisory stage and 2.5 feet below the March 1951 crest.

STORY OF THE FLOODS

Following the moderate rises that resulted from the storm of September 28-29, streams receded steadily and were near normal levels for the season when rain began over the area late on October 3. Small streams were soon out of banks and some had crested by noon, while larger streams continued to rise until midafternoon or dusk on October 4. Traffic was affected by the overflow of roads. Land was scoured or affected by deposits of silt, sand, and gravel; crops were damaged or washed away, with the more serious damage on Brasstown, Hemptown, and Butternut Creeks.

Hiwassee River

Overflow along Hiwassee River above Chatuge Reservoir on October 4 affected pastures and some cropland. Flooding is a fairly commonplace occurrence in this reach, and land and crops are generally not seriously affected.

Between Chatuge Dam and the mouth of Brasstown Creek there was no flooding because of the effect of floodwater storage in Chatuge Reservoir. Heavy discharge from Brasstown Creek caused flooding of bottomland along Hiwassee River from that point to the head of Hiwassee Reservoir at Murphy.

Brasstown Creek--Brasstown Creek and most of its tributaries experienced severe flooding on October 4 with damage to land, crops, roads, and bridges. Witnesses to the flood describe both the rise and the fall as being very rapid. Stream channels are generally steep and the resulting high velocities knocked down crops, scoured bottomlands and unpaved road surfaces, and damaged bridge approaches. Overflow of roads stopped traffic for periods of several hours on former U. S. Highway 64 near Warne, North Carolina, and on Georgia Highway 66 near Young Harris. Schools in all of Towns County, Georgia, and in parts of Clay County, North Carolina, were closed on Monday, October 5, because of damage to roads.

Nottely River--Nottely River bottomlands are narrow or rise steeply from the river, so that October 4 overflow and the resulting damage was not significant along the river above Nottely Reservoir.

Extensive flooding occurred along Butternut Creek. At the Blairsville Golf Course, the overflow caused considerable washing and scouring of greens and fairways under construction.

Valley River--No flooding occurred on the Valley River, where the crest on October 4 at Tomotla stream gage was about 5 feet below the advisory stage.

Toccoa-Ocoee River

The Toccoa River overflow on October 4 affected use of county roads for periods up to 12 hours, caused a moderate amount of washing in fields, and left deposits of sand and silt on bottom lands above Blue Ridge Reservoir.

Nearly all the flood flow was retained in Blue Ridge Reservoir and there was no flooding for some distance below the dam. Inflow from the intervening drainage area between the dam and the contiguous communities of Copperhill, Tennessee, and McCaysville, Georgia, and particularly the heavy flow which came from Hemptown Creek, was sufficient to produce a flood which gave some anxious moments to the residents of the two towns, who well remembered the damaging flood they had on March 29, 1951. The flood in the reach through the residential and business sections was generally about 0.5 foot lower than the 1951 flood. In the lower end of Copperhill, below the mouth of Fightingtown Creek, the Ocoee River flood crest was slightly higher than that of the 1951 flood, although on Fightingtown Creek itself the flood peak discharge was lower than the peak discharge which occurred in 1951. This resulted from a difference in the timing of the arrival of the flood peaks at the confluence of the two streams in this flood as compared with the 1951 flood.

Water was over Georgia Highway 5 where it intersects Ocoee Street in Copperhill, and entered an auto showroom and a service station. Basements of several residences were flooded. Water was in a body and paint shop and covered an athletic field downstream from the center of the business district. Overflow at the intersection of Georgia Highway 5 and Ocoee Street blocked traffic for a time from Copperhill upstream on the right bank of the river. Georgia Highway 5 bridge was out of service, but cross-river traffic continued at the steel truss bridge at Grand Avenue, just downstream.

Hemptown Creek--The October flood on Hemptown Creek overflowed more than 2,000 acres of bottomland in the vicinity of Morganton and Mineral Bluff, Georgia. Interviews with local residents indicated that this flood was about the same height to slightly higher than a flood in 1918.

Fightingtown Creek--There was no flooding on Fightingtown Creek of any significance, except near the mouth where backwater from Ocoee River affected conditions.

FLOOD DAMAGES

Damages resulting from the flood of October 4, 1964, in the Hiwassee River basin are estimated at \$118,000. Damage to highways and bridges accounted for half of this total.

Damage estimates were based upon interviews with the affected property owners and with agricultural agents and state, county, and local officials. Table 13 is a summary of the damages for the upper Hiwassee and Toccoa River basins. Tables 24 and 25 in Appendix D are tabulations giving additional details on the losses, listed separately for the upper Hiwassee River basin and the Toccoa-Ocoee River basin, respectively. These show the losses in the Toccoa-Ocoee River basin to total \$18,000 and in the upper Hiwassee River basin to amount to a total of \$100,000. The totals include an estimate of intangible losses amounting to approximately 10 percent of the total tangible losses, to cover such items as loss of business, loss of payroll, and additional travel expense necessitated by interruptions to traffic and similar losses of an indirect nature.

The flood losses were limited to the upper portion of the Hiwassee River and of its principal tributaries. Specifically, these included the main stream and its tributaries upstream from Murphy, the Nottely River basin upstream from Nottely Reservoir, and the Toccoa-Ocoee River basin upstream from Ocoee No. 3 Reservoir.

Agricultural and rural property damages were highest in the Brasstown Creek and Hemptown Creek basins. Highway damage was distributed fairly generally over the storm area.

TABLE 13
SUMMARY OF DAMAGES
UPPER HIWASSEE AND TOCCOA RIVER BASINS
 Flood of October 4, 1964

Industrial

Brasstown Creek		
1 Firm affected		\$ 15,000

Commercial

Nottely River		
Golf course	\$ 3,500	
Toccoa-Ocoee River, Copperhill		
4 Firms affected	<u>210</u>	3,710

Residential

Brasstown Creek	3,750	
Toccoa-Ocoee River, Copperhill	<u>100</u>	3,850

Agricultural

Brasstown Creek	11,550	
Hempton Creek	<u>4,740</u>	16,290

Rural Property

Brasstown Creek	3,600	
Nottely River	2,500	
Upper Toccoa River	400	
Hempton Creek	<u>5,050</u>	11,550

Highways

Towns County, Georgia	18,000	
Union County, Georgia	20,000	
Fannin County, Georgia	6,000	
Clay County, North Carolina	<u>12,700</u>	<u>56,700</u>

Total tangible damage	\$107,100
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Estimated intangible damage	<u>10,900</u>
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Total, all damage	\$118,000
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Upper Hiwassee River

For the Hiwassee River basin above Murphy highway damage amounted to \$30,700, of which \$18,000 occurred in Towns County, Georgia, and \$12,700 in Clay County, North Carolina. A sizable part of this was within the Brasstown Creek watershed. Damage to crops and land along the main stream was insignificant.

Brasstown Creek--Damages in the Brasstown Creek watershed, exclusive of highway losses, amounted to \$33,900, the highest of any of the subdivisions of the Hiwassee River basin.

At the plant of the Coble Dairy Company, located in the flood plain of Brasstown Creek a short distance above Brasstown, North Carolina, water entered a frozen dairy products storage causing damage.

Crop damages amounted to \$11,550. Corn was damaged on 47.5 acres for a loss of \$2,850. Fifty-four acres of hay was washed away or severely damaged. There was a \$2,020 loss in sorghum cane, more than half of the loss being sustained by one farmer. This crop is raised for the production of sorghum syrup and the crop was ready for harvest when the flood hit. Pasture totaling 72 acres had damages by scour or due to deposits of sediment. An 8-acre crop of green peppers was destroyed. On one farm \$600 worth of tobacco was washed away which had been left to dry in the field. There also was flooding and damage at two other tracts of tobacco.

Residential damage amounted to \$3,750. A one-story farmhouse near Welch Mill Dam was washed away. The occupants evacuated the dwelling just before it was carried away.

Damage to land by washing and scouring was estimated at \$2,350. Damage to fences and private roads and bridges amounted to \$1,250. At a sharp bend of the creek on the P. R. Campbell farm, the stream bank was cut back by amounts varying between 25 and 85 feet over a distance of 300 feet. Appreciable work will be required to prevent further cutting at this point.

Nottely River

Mr. Marion Chambers, Highway Commissioner of Union County, Georgia, estimated that damages to roads and bridges in that county, mostly within the Nottely River drainage, amounted to \$20,000.

The heavy runoff on Butternut Creek caused severe washing and scour of land in that watershed. Over half of the estimated \$6,000 loss in this category was to the grounds of the Blairsville Golf Course, where grading and seeding of greens was nearing completion when the flood occurred.

Toccoa-Ocoee River

The shallow overflow in McCaysville and Copperhill resulted in only minor residential and commercial damage, although the residents were alerted and anticipating more serious damage. Protective measures which were taken held damages down in many cases. At the Dickey Motor Company sandbags at the doors kept much of the water from their building, and held damage to buckling of a wood floor. In the paint and body shop of the Higdon-Howell Motor Company tools and materials were moved in advance of the flood, but water damaged a heating plant.

Basements were flooded at three residences with damage to water heaters, tools, and other stored items.

Fannin County Highway Commissioner Ashe estimated damage of \$6,000 to roads and bridges in the county as a result of the flood.

Hemptown Creek--The largest items of damage in the Toccoa-Ocoee River basin were the losses to agriculture and rural property in the Hemptown Creek watershed.

Mature corn totaling 56 acres was damaged an estimated \$3,040. A 5-acre field of collards was destroyed. Damages to hay and pastures were smaller items in this watershed.

Land scour and damage to stream banks amounted to \$3,900. A private bridge over Hemptown Creek downstream from Mineral Bluff was destroyed, for a loss of \$1,000.

Appendix F contains representative photographs taken during and after the flood of October 4-5, 1964.

V.

APPENDICES

APPENDIX A
EFFECT OF THE STORMS OF SEPTEMBER-OCTOBER 1964
UPON
TVA TRIBUTARY MULTIPLE-PURPOSE RESERVOIRS

EFFECT OF THE STORMS OF SEPTEMBER 28 TO 30, OCTOBER 4 AND 5,
AND OCTOBER 16 AND 17 UPON
TVA TRIBUTARY MULTIPLE-PURPOSE RESERVOIRS

Three severe storms occurred over parts of the eastern portion of the Tennessee Valley with a period of less than one month. The two storms of September 28-30 and October 4-5, 1964, were unusual in that both induced extremely heavy rainfall in the same general area of the Blue Ridge Mountains along the southeastern rim of the Tennessee River Basin. The third storm, on October 16-17, produced abundant rain in the eastern quarter of the basin.

Excessive rainfall and runoff from the three storms developed in drainage areas of tributary multiple-purpose reservoirs. During the last half of the year tributary multiple-purpose reservoirs were being drawn to December 31 flood control levels and space was available to store the increased flows. Just before the first storm, Cherokee Reservoir was about 9 feet and Douglas Reservoir about 6 feet below normal seasonal levels. Fontana Reservoir was about 27 feet and Norris Reservoir about 13 feet above normal seasonal levels, while other tributary multiple-purpose reservoirs were above by about 2 to 9 feet. The high levels at Fontana and Norris Reservoirs resulted from limitations upon discharges earlier in the summer due to generating units being out of service for maintenance. Tennessee River main-stream reservoirs were near normal seasonal levels.

Rainfall from the first storm, that of September 28-30, averaged approximately 3 inches over the Tennessee Valley. However, heavy amounts fell along the extreme southern edge of the Valley. Amounts from 5 to 8 inches were reported along the southeastern rim of the drainage areas of Chatuge and Nottely Reservoirs. The greatest downpour, however, occurred in the upper reaches of the Fontana Reservoir drainage area and in the utmost reaches of the Douglas Reservoir drainage area, where amounts generally ranged from about 6 to 8 inches, with a few higher amounts reported.

September, prior to this storm, had been extremely dry and conditions were not favorable for high runoff. Thus the increase in flows from the storm were only moderate. Between September 27 and October 3 Douglas and Nottely Reservoirs were filled about 7 and 5 feet, respectively; Watauga, Fontana, and

Chatuge Reservoirs were filled between 2 and 3 feet; and other tributary multiple-purpose reservoirs were filled less than 1 foot, except Hiwassee which was drawn about 2 feet. Flows were such that main-stream multiple-purpose reservoirs were held near normal seasonal levels without spillway discharge, but Kentucky Reservoir was filled temporarily about one foot.

The second storm of October 4 and 5, associated with Hurricane Hilda, followed after four days. Precipitation was not significant in the portion of the Valley west of Chattanooga, but heavy rains again fell in the southeastern section of the Valley. Intense rains of 6 to 8 inches from this storm covered the drainage areas of Chatuge, Nottely, Hiwassee, and Fontana Reservoirs, and were more widespread than in the previous storm. In the Douglas drainage area the drenching rains covered the upper reaches above Asheville and Canton, where maximum precipitation amounts for the storm were reported.

Since the downpour from the October 4-5 storm fell after a lapse of only four days from the earlier storm, conditions were conducive to very high runoff. Flows from this storm generated record crests for this season of the year along streams in the southeastern portion of the Valley. At Fontana Reservoir the crest inflow of 56,000 cubic feet per second on October 4 was the highest for the May-to-October period, except for the prerecord floods of May 1840 and October 1898. Fontana Reservoir level rose about 12 feet between October 3 and 8.

At Chatuge Reservoir the crest inflow was 16,000 cubic feet per second and at Nottely 21,000 cubic feet per second on October 4. Between October 3 and 8 Chatuge Reservoir was filled about 7 feet and Nottely 18 feet. At Hiwassee Dam the natural crest discharge (the crest that would have occurred without benefit of regulation by upstream reservoirs) of 56,000 cubic feet per second on October 4 would have been exceeded only by the November 1906 flood in the period of record beginning in 1900. Hiwassee Reservoir was filled about 6 feet between October 3 and 6.

At Douglas the twin crest flows of 45,000 cubic feet per second on October 5 and 6 were not a record, but the reservoir level rose about 12 feet between October 3 and 10. Increased inflows at other tributary multiple-purpose reservoirs were moderate and the reservoirs experienced small rises.

At main-stream reservoirs only the local drainage area of Chickamauga Reservoir had sufficiently increased flows to require spillway discharge to limit filling. The discharge was increased from available turbine capacity of three units to about 61,500 cubic feet per second beginning at 2 p.m. on October 4. One unit was out of service for maintenance. Hales Bar discharge was also increased from turbine capacity to 63,800 cubic feet per second to regulate reservoir levels. About noon on October 5 Chickamauga and Hales Bar discharges were gradually reduced to turbine capacity. Discharges at other main-stream dams did not exceed turbine capacity, and all reservoirs were kept near seasonal levels except Kentucky, which was filled temporarily about one foot.

The third storm, that of October 16-17, took place as an aftermath of Hurricane Isbell, dumping from 3 to 5 inches of rain over the eastern quarter of the Tennessee Valley. The heaviest rains fell over the Norris Reservoir drainage area above Arthur and Tazewell, and over all of the Holston River valley above Cherokee Dam. In the Douglas Reservoir drainage area the downpour covered the whole Nolichucky River valley, and the middle reaches of the French Broad and Pigeon Rivers between Newport, Canton, and Asheville.

Because only ten days had passed since the preceding storm, conditions were still present to produce high runoff and the storm yielded abundant flows over the Holston River and parts of the French Broad River valleys. At South Holston Reservoir the crest inflow was 10,000 cubic feet per second and at Watauga Reservoir 22,000 cubic feet per second, both on October 16.

Regulation at upstream multiple-purpose reservoirs prevented serious flooding along the Watauga and South Holston Rivers. The Watauga River at Elizabethton, below Watauga Dam, had a computed natural crest stage of 14.1 feet on October 16. Only three flood crests exceeded this stage since records began in 1910--the July 1916, August 1940, and March 1963 floods. Regulation at Watauga Dam reduced the crest stage to an observed 8.6 feet on October 16. Had it not been for upstream regulation, the natural crest inflow at Boone Reservoir would have been 42,000 cubic feet per second on October 17, and at Cherokee 47,000 cubic feet per second on October 18. The computed natural crest stage on the South Fork of the Holston River at Kingsport below Boone was 12.6 feet on October 17 and was surpassed only by the August 1940 flood in the May-to-November period since records began in 1925. Regulation by upstream dams reduced the Kingsport stage to 3.3 feet on October 17.

At Douglas Reservoir a crest inflow of 68,000 cubic feet per second was reached on October 16. Except for the November 1906 flood, this is the highest known crest flow for the months of September through November.

South Holston Reservoir was filled about 5 feet between October 15 and 20, Watauga Reservoir about 8 feet between October 15 and 21, Boone Reservoir about 4 feet between October 15 and 17, and Douglas Reservoir about 8 feet between October 15 and 19. Increased flows into other tributary and main-stream multiple-purpose reservoirs were not noteworthy.

The effect of the high volume of flows stored in tributary multiple-purpose reservoirs from the three storms is reflected in the useful water in storage in multiple-purpose reservoirs above Chickamauga. At the end of October this volume was equal to 4.20 inches of runoff and an increase of 0.15 inch over the useful water in storage at the end of September. This small increase was due to the large amount of hydroelectric generation during October, which also prevented any of the tributary multiple-purpose reservoir levels from exceeding the previous maximum levels for October. During the period of operation of the TVA multiple-purpose reservoirs, only on October 31, 1949, with 4.62 inches of runoff in useful storage above Chickamauga, was the volume greater at that time than in 1964.

Usually in October a considerable volume of water is withdrawn from storage. However, 1964 was the first year since the inception of the TVA multiple-purpose reservoir system that the volume of useful water in storage above Chickamauga Dam at the end of October was greater than at the end of September.

The high volume of water in storage at the end of October, coupled with above-normal rainfall in November and December, resulted in ample water for hydroelectric power production for the remainder of the year as the multiple-purpose reservoirs were lowered to their December 31 flood control levels. From early October to the end of the year, Douglas was operated near turbine capacity. Norris was operated at available turbine capacity until early November with one unit out for maintenance, and at turbine capacity after that. Fontana was operated to supply Calderwood at turbine capacity, and Chatuge, Nottely, and Hiwassee were operated to supply Apalachia at turbine capacity. Tributary multiple-purpose reservoirs in the Holston River system were lowered to December 31 flood control levels with less than turbine capacity generation.

The large amount of water in useful storage at tributary multiple-purpose plants also made possible the operation to draw Guntersville Reservoir 2 feet below minimum winter operating level from November 16 to December 31 in an effort to control the aquatic weed, Eurasian watermilfoil. Water in storage at tributary plants compensated for the loss in generating head at Guntersville and also furnished ample water to maintain navigable depths at critical points in the upper reaches of Guntersville Reservoir during this period.

APPENDIX B
DAILY RAINFALL AND STORM TOTALS
FOR STATIONS IN THE UPPER
FRENCH BROAD, LITTLE TENNESSEE, AND HIWASSEE RIVER BASINS

TABLE 14
DAILY RAINFALL AND STORM TOTALS
UPPER FRENCH BROAD RIVER BASIN

Station Number	Station	Owner	Elev. feet	Daily Rainfall in Inches								Storm Totals in Inches			Sept. 28-	
				September			October					Sept. 28-30 ^(a)	Oct. 2-3	Oct. 4-5 ^(b)	Oct. 5	
				28	29	30	1	2	3	4	5	6				
218	Camp Creek Bald (R)	TVA	4560		.67	2.79	.08	.32	.24	.47	1.13		3.54	.56	1.60	5.70
228	Coxcomb Mountain (R)	TVA	4350		1.55	2.24	.72	.03	.05	1.05	1.24	.01	4.51	.08	2.30	6.89
733	Clingmans Peak (X)	USWB	6525	.17	6.00	1.52	1.20	.08	T	2.40	.15		8.89	.08	2.55	11.52
244	Waterville (XX)	USWB	1440		1.42	.57	.06	.50	.01	1.58	.01		2.05	.51	1.59	4.15
245	Mt. Sterling	TVA	2915		.41	1.58	.35	F	.32	.98	1.23		2.34	.32	2.21	4.87
656A	Cataloochee (R)	TVA	2590		.40	.99	.55	.34	.09	1.46	.83		1.94	.43	2.29	4.66
656	Cataloochee	USDI	2590		.40	1.10	.28	.55	.10	1.50	.84		1.78	.65	2.34	4.77
407	Cataloochee Ranch (Z)	TVA	4800	T	F	2.70	#.56	#.35	F	3.90			3.26	.35	3.90	7.51
247	Waynesville (X)	USWB	2675	.02	2.61	.77	.11	.03		3.73	.49		3.51	.03	4.22	7.76
248	Eaglenest Mountain	TVA	3280	.05	1.45	1.72	.74	.50	.06	2.60	1.22		3.96	.56	3.82	8.34
250	Chambers Mountain (R)	TVA	4300		1.30	1.05	.58	.01	.03	1.85	1.05		2.93	.04	2.90	5.87
251A	Canton	CP&FCO	2700		.96	1.47	.47	.12	.02	1.90	1.81		2.90	.14	3.71	6.75
251	Canton (XX)	CP&FCO	2600	.15	1.91	.59	.14	.02	.02	3.48	.20		2.79	.04	3.68	6.51
253	Dix Creek	TVA	3060	.05	1.62	1.77	.64			3.00	2.06		4.08	0	5.06	9.14
254	Mt. Pisgah (R)	TVA	5160	.10	2.46	2.37	1.26	.12	.03	2.75	3.46		6.19	.15	6.21	12.55
629	Big East Fork Pigeon	TVA	3410	1.13	4.22	2.43	.94			3.90	2.27		8.72	0	6.17	14.89
742	Sunburst (Radio)	CP&FCO	3100		1.7	2.0	1.2	.6		1.9	4.0		4.9	.6	5.9	11.4
256	Hot Springs	USWB	1335		.16	2.25	.17	.23	.10	.55	1.00		2.58	.33	1.55	4.46
256A	Hot Springs, Airways	USWB	1480		.24	2.31	.30		.14	.89	.68		2.85	.14	1.57	4.56
257	Max Patch Mountain (R)	TVA	4285		.21	2.29	.33	.05	.16	1.30	.80		2.83	.21	2.10	5.14
719	Maple Spring Gap	TVA	3790		.37	1.14	.29	.24	.12	.38	1.68		1.80	.36	2.06	4.22
261A	Tug Fork	TVA	2850		.38	1.09	.32	.13	.04	.78	.97		1.79	.17	1.75	3.71
259	Cody Store	TVA	2550		.94	2.55	#.24	#.08	#.08	.62	.87		3.73	.16	1.49	5.38
672	Sams Gap (Radio)	TVA	3760		.4	2.3	.3	.1	.1	.6	.9		3.0	.2	1.5	4.7
262	Marshall	USWB	1950		.97	1.61	.40	.25	.25	.77	.80		2.98	.50	1.57	5.05
263	Ivy	TVA	2150	.09	.88	1.78	.42	.11	.05	.90	.82		3.17	.16	1.72	5.05
264	Barnardsville	TVA	2250		F	3.50	.15	.55		.96	2.07		3.65	.55	4.22	8.42
666	Weaverville	TVA	2220	T	1.29	1.44	.43	.03	.06	1.30	1.23		3.16	.09	2.55	5.80
265	Leicester	TVA	2170	T	1.39	.90	.62	.06	.01	1.50	1.13		2.91	.07	2.63	5.61
786	Parker Branch (R)	TVA	2030		1.29	1.04	.41		.05	1.45	.85		2.74	.05	2.30	5.09
267	Asheville (R) (XX)	USWB	2274	.17	3.50	.75	.53	.02	.01	3.55	.25		4.95	.03	3.80	8.78
268A	Beetree Dam	TVA	2540	.02	1.81	3.48	.96	.25	.01	1.87	1.79	T	6.27	.26	3.66	10.19
268	Beetree Dam (R)	TVA	2540	.02	1.90	3.65	1.05	.08		1.99	1.78	.02	6.62	.08	3.79	10.49
269	Craggy Knob (R)	TVA	4970	.05	1.90	4.15	1.65	.03	.03	1.64	1.35		7.75	.06	2.99	10.80
270	Swannanoa, Near	USWB	2260	.02	1.80	2.45	.85	.10	T	2.13	2.16		7.15	.10	4.29	9.51
271A	North Fork, No. 2	USWB	2520	.03	1.74	3.33	.86	.19	.02	1.55	1.71		5.96	.21	3.26	9.43
271	North Fork (R)	TVA	2765	.06	1.85	4.10	.95	.54		1.40	1.45	.01	6.96	.54	2.86	10.36
700	Black Mountain (X)	USWB	2400	.02	3.35	.89	.65	.02		4.00	.45		4.91	.02	4.45	9.38
274	Enka	USWB	2050	.02	1.40	2.26	.67	.50	.12	2.08	2.22	.04	4.35	.62	4.34	9.31
266	Rockyface Mountain	TVA	3100		1.21	1.40	.53		.09	1.93	1.21		3.14	.09	3.14	6.37
275	Bent Creek (Z)	USFS	2110	T	3.86	1.34	.90	.03	.06	4.93	.40		6.10	.09	5.33	11.52
791	Asheville Airport (R) (XX)	USWB	2140	.17	4.40	.69	.39	.02	.04	5.18	.41		5.65	.06	5.59	11.30
276B	A & H Airport	TVA	2090	.01	2.33	2.50	.59	.09	.02	2.69	2.91	.13	5.43	.11	5.73	11.27
277	Garren Creek	TVA	2620	.10	2.08	1.98	.64		.20	3.10	2.65	T	4.80	.20	5.75	10.75
278	Blue Ridge P. O. (R)	TVA	2270	.23	2.39	#2.65	#.32	F	#.20	F	#7.53	.04	#5.59	#.20	#7.57	#13.36
279	Hendersonville (X)	USWB	2080	.07	4.55	1.70	.41	.12	.01	F	#8.75		6.73	.13	#8.75	#15.61
279A	Hendersonville	TVA	2185	.04	4.00	2.54	.27	.25	.03	3.95	4.60		6.85	.28	8.55	15.68
280	Rush Mountain	TVA	2950	.32	3.30	4.45	.53	.38	.05	6.10	3.65	.07	8.60	.43	9.82	18.85
282	Pink Beds (R)	TVA	3285	.25	4.92	4.28	1.20	.40	.01	3.55	2.82		10.65	.41	6.37	17.43
766A	Fletcher, Near (X)	NC	2070	.08	4.25	.97	.46	.01	.04	5.27	.44		5.76	.05	5.71	11.52
281C	Mills River (R)	TVA	2150	.05	3.39	2.66	.30			3.50	3.03	.06	6.40	0	6.59	12.99
283A	Buck Forrest	TVA	2515	.13	3.73	5.40	.33	.32	.03	3.60	6.53	.16	9.59	.35	10.29	20.23
283	Cedar Mountain (R)	TVA	2750	.20	3.50	#6.80	.84	.24	.03	5.34	F	#6.05	#11.34	.27	#11.39	#23.00
284	Caesars Head (X)	USWB	3115	.41	7.15	2.15	.82	.15	T	10.00	1.05		10.53	.15	11.05	21.73
476	Pisgah Forest	USWB	2150	.05	4.16	3.83	1.14	.18	.04	3.87	4.60	.06	9.18	.22	8.53	17.93
662	Gloucester Gap (R)	TVA	3120	.27	6.07	3.80	1.00	.28	.04	2.90	5.16	.08	11.14	.32	8.14	19.60
285	Brevard (X)	USWB	2120	.14	6.90	1.42	.50	.14	.32	5.53	4.16		8.96	.46	9.69	19.11
286	Rosman, No. 2	TVA	2230	.41	7.14	8.80	.89	.57	.04	4.08	13.10	.35	17.24	.61	17.53	35.38
640	Sassafras Mt.	TVA	3440	.03	5.31	6.09	.50	.04	.72	4.02	6.13	.06	11.93	.76	10.21	22.50
663A	Quebec (R)	TVA	2920	.33	6.43	5.90	1.23	.36	.04	5.15	F	4.80	13.89	.40	9.95	24.24
723	Lake Toxaway	USWB	3080	.62	7.15	6.36	1.13	.33	.07	5.22	4.84	.07	15.26	.40	10.13	25.79

Rainfall is for 24 hours, observed at morning, except as follows:
 (X) at evening. (XX) at or near midnight. (Z) near noon.

(a) Includes rainfall reported on October 1.
 (b) Includes rainfall reported on October 6.
 R Recording gage.
 F Included in next measurement.
 # Interpolated or partly interpolated.
 T Indicates less than 0.01 inch.

TABLE 15
DAILY RAINFALL AND STORM TOTALS
UPPER LITTLE TENNESSEE RIVER BASIN

Station Number	Station	Owner	Elev. Feet	Daily Rainfall in Inches								Storm Totals in Inches				
				September			October					Sept. 28-30 ^(a)		Oct. 2-3	Oct. 4-5 ^(b)	Sept. 28-Oct. 5
				28	29	30	1	2	3	4	5	6				
179	Haw Knob (R)	TVA	4980		1.02	1.82	.30		.08	2.04	1.69	.01	3.14	.08	3.74	6.96
178	Cheeah Dam	Alcoa	1110		.97	.72	.09	.49	.03	1.10	1.50		1.78	.52	2.60	4.90
180	Santeetlah Dam	Alcoa	1960		.50	1.02	.26		.06	2.90	1.63		1.78	.06	4.53	6.37
778	Lt.Santeetlah Cr.No.1(R)	TVA	2100	.05	.77	1.08	.40		.10	2.13	.94		2.30	.10	3.07	5.47
778A	Lt.Santeetlah Cr.No.2(R)	TVA	2840	.05	.85	1.12	.38		.10	1.85	1.33		2.40	.10	3.18	5.68
778B	Lt.Santeetlah Cr.No.3(R)	TVA	4690	.01	.88	1.60	.40		.23	1.65	1.35		2.89	.23	3.00	6.12
778C	Lt.Santeetlah Cr.No.4(R)	TVA	4650	.01	.90	1.34	.70		.13	1.90	1.40		2.95	.13	3.30	6.38
550	Santeetlah Gap (R)	TVA	2640		.65	1.00	.29		.22	1.95	1.41		1.94	.22	3.36	5.52
660	Twentymile	USDI	1310		1.02	.80	.13	.02	.23	1.60	1.10		1.95	.25	2.70	4.90
592	Fontana Dam	TVA	1312		.48	1.49	.29		.30	1.60	1.63		2.26	.30	3.23	5.79
181	Proctor (R)	TVA	1720		.60	1.78	.07		.26	1.95	.83		2.45	.26	2.78	5.49
182	Steechah	TVA	2040		.64	1.80				F	3.91		2.44		3.91	6.35
183	Noland Cr. (R)	TVA	2520		.58	1.70	.55		.09	2.38	.51		2.83	.09	2.89	5.81
184	Clingmans Dome (R)	TVA	6250		.66	2.52	.32		.20	2.30	.84		3.50	.20	3.14	6.84
184A	Clingmans Dome (Radio)	TVA	6250		.2	2.9	.2		.2	2.1	1.0		3.3	.2	3.1	6.6
185	Bryson City (R)	TVA	1735		.68	1.41	.22		.10	2.14	1.34		2.31	.10	3.48	5.89
525	Ela, near	NPCO	1830		1.71	.97	.21		.15	F	4.11		2.89	.15	4.11	7.15
542	Cherokee	USDI	1950		.65	1.65	.44		.10	F	3.50		2.74	.10	3.50	6.34
186	Oconalufy	USDI	2100		.72	1.43	.25		.14	1.95	1.03		2.40	.14	2.98	5.52
599	Big Cove (Radio)	TVA	2620		.7	2.0	.4			1.6	1.0		3.1		2.6	5.7
187	Spruce Mountain (R)	TVA	4600		.78	1.82	.80	.10		1.70	1.04	.01	3.40	.10	2.75	6.25
377	Jacks Cove	TVA	1920		2.06	.65	.95		.15	2.75	1.16		3.66	.15	3.91	7.72
249	Balsam	TVA	3330	.05	1.55	2.25	.95	.10	T	2.85	1.85		4.80	.10	4.70	9.60
189	Cullowhee (X)	USWB	2100	.04	3.25	1.54	.12	.20	T	3.67	.53	.03	4.95	.20	4.23	9.38
564A	Thorpe Powerhouse	NPCO	2320	.05	4.70	2.22	.88	.02	.11	2.78	3.95	.12	7.85	.13	6.85	14.83
564	Thorpe Dam	NPCO	3550	.24	5.70	2.00	.94		.25	4.04	3.26	.04	8.88	.25	7.34	16.47
509	Laurel Mountain (R)	TVA	4080	.62	6.00	#4.25	#1.15	.17	.04	4.35	4.46	#12.02	2.21	8.81	#21.04	
190	Haywood Gap (R)	TVA	5400	.58	6.23	3.40	1.00	.57	.03	F	F	9.33	11.21	.60	9.33	21.14
191	Owens Gap	TVA	3520	.70	5.40	3.86	.94	.60	.53	4.90	3.08		10.90	1.13	7.98	20.01
193	Nantahala	NPCO	2020		.43	2.09	.32	.53	.53	2.35	2.32		2.84	1.06	4.67	8.57
594	Nantahala Dam	NPCO	2950		.85	2.45	.69		.06	3.92	2.55		3.99	.06	6.47	10.52
600	Wallace Gap (Radio)	TVA	3400		F	4.8	2.0	.2		3.6	3.7	.1	6.8	.2	7.4	14.4
194	Needmore	TVA	1830		.79	1.73	.27	.01	.84	2.50	1.60		2.79	.85	4.10	7.74
195	Raven Mountain (R)	TVA	4500		1.42	1.90	.90		.30	2.72	1.50		4.22	.30	4.22	8.74
196	Franklin Powerhouse	NPCO	2000	.10	3.07	1.87	1.65	.05	.07	F	7.05		6.69	.12	7.05	13.86
198	Franklin	TVA	2120	.08	3.81	1.96	1.68			4.61	2.47		7.53		7.08	14.61
586	Cartoogechaye Creek	TVA	2200	.08	3.19	2.31	1.68	.13	.08	4.08	2.84		7.26	.21	6.92	14.39
197	Wayah Bald (R)	TVA	5350		1.45	2.60	1.13	.01	.07	3.80	2.05		5.18	.08	5.85	11.11
199	Otto	TVA	2255	.04	6.58	1.64	1.87			6.24	2.70		10.13		8.94	19.07
200E	Coveata No. 20	USFS		.23	5.98	3.91	1.07	.10		5.27	3.53		11.19	.10	8.80	20.09
200F	Coveata No. 31	USFS		.45	7.04	4.12	1.15	.26	.04	5.53	3.82	.04	12.76	.30	9.39	22.45
201A	Highlands	TVA	3790	.47	7.60	4.50	1.80	.41	T	4.52	6.24	.03	14.37	.41	10.79	25.57
201	Highlands, near (X)	USWB	3350	.59	11.87	1.92	.70	.32	.01	9.91	.65		15.08	.33	10.56	25.97

Rainfall is for 24 hours, observed at morning, except as follows:
 (X) at evening.

(a) Includes rainfall reported on October 1.
 (b) Includes rainfall reported on October 6.
 R - Recording gage.
 F - Included in next measurement.
 # - Interpolated or partly interpolated.
 T - Indicates less than 0.01 inch.

TABLE 16
DAILY RAINFALL AND STORM TOTALS
UPPER HIWASSEE RIVER BASIN

Station Number	Station	Owner	Elev. feet	Daily Rainfall in Inches							Storm Totals in Inches					
				28	29	30	1	2	3	4	5	6	Sept. 28-30 ^(a)	Oct. 2-3	Oct. 4-5 ^(b)	Sept. 28-Oct. 5
107	Copperhill	USWB	1624	.01	.78	.63	.25		.05	4.37	1.45		1.67	.05	5.82	7.54
571	Higdon's Store (Radio)	TVA	1890		.8	.9	.6			3.0	3.6		2.3		6.6	8.9
109	Flat Top (R)	TVA	3650	.01	2.34	.89	.63	.01		5.40	2.17		3.87	.01	7.57	11.45
110	Blue Ridge Dam	TVA	1560		.50	1.70	.50		.50	3.30	4.60	T	2.70	.50	7.90	11.10
367	Blue Ridge (X)	USWB	1760		1.91	1.02	T	.02		8.27	.19		2.93	.02	8.46	11.41
111	Stanley Gap (R)	TVA	2300	.01	.86	1.26	.25	.09		5.90	5.55		2.38	.09	11.45	13.92
112	Noontootla Creek	TVA	1975		.57	2.11	.59		.11	3.51	3.88		3.27	.11	7.39	10.77
633	Dial Post Office	TVA	1900		1.25	1.22	.56	.01		4.78	4.52		3.03	.01	9.30	12.34
633A	Dial Post Office (Radio)	TVA	1860		.3	2.0	.7			3.1	5.9	.1	3.0		9.1	12.1
720	Grizzle Creek (Radio)	TVA	2120		1.5	3.3	1.0	.1	.1	2.6	3.9		5.8	.2	6.5	12.5
115	Suches	TVA	2800	.47	1.03	2.10	1.22	.22		3.85	4.55		4.82	.22	8.40	13.44
125	Hivasssee Dam (R)	TVA	1493		.45	1.03	.18		.44	3.38	1.08		1.66	.44	4.46	6.56
125A	Hivasssee Dam No. 2	TVA	1310		.40	1.03	.21		.36	2.00	2.36		1.64	.36	4.36	6.36
126	Beaverdam Creek	TVA	1880		.51	1.02	.30		.02	2.10	1.64		1.83	.02	3.74	5.59
127	Letitia	TVA	1805		.20	1.37	.44		.36	3.50	1.35		2.01	.36	4.85	7.22
129	Sweet Gum (R)	TVA	1800		.73	1.14	.54		.93	4.18	1.90		2.41	.93	6.08	9.42
750	Antioch	TVA	1970	.15	.20	2.16	.69		.13	4.13	3.84		3.20	.13	7.97	11.30
131	Hempton Gap	TVA	2090	.07	.22	1.78	.35		.06	4.35	3.56		2.42	.06	7.91	10.39
133	Blairsville No. 2	TVA	1825	.24	2.27	3.23	.67	.05	.10	4.26	3.40		6.41	.15	7.66	14.22
570	Choestoe	TVA	1900	.17	3.42	3.43	.76	.05	.47	2.47	4.08		7.78	.52	6.55	14.85
570A	Choestoe (Radio)	TVA	1900	.1	3.2	3.4	.8		.4	2.2	4.1		7.5	.4	6.3	14.2
135	Neel Gap (R)	TVA	3300	F	F	#7.00	#.75	F	#.50	F	10.00		#7.75	#.50	10.00	#18.25
136	Murphy Evap. Sta. (R)	TVA	1575		.40	1.52	.23		.32	3.40	1.57		2.15	.32	4.97	7.44
138	Tomotla	TVA	1575	.10	.25	1.85	.15			3.00	1.50		2.35		4.50	6.85
140	Hyatt Creek (R)	TVA	2450	.02	.67	1.57	.25		.04	3.21	1.35		2.51	.04	4.56	7.11
141	Andrews	USWB	1840	.02	.42	2.00	.25			2.81	1.68		2.69		4.49	7.18
362	Teyahalee Bald (R)	TVA	4750	.06	.51	2.32	.38	.04	.07	2.80	1.83		3.27	.11	4.63	8.01
146	Young Harris	TVA	1920	.03	3.14	2.79	1.05	.01	.01	5.75	3.22	.01	7.01	.02	8.98	16.01
146A	Young Harris (Radio)	TVA	1930		2.9	2.7	1.0			3.9	4.5		6.6		8.4	15.0
147	Brasstown Bald (R)	TVA	4780	.05	4.46	3.66	1.09	.03	.03	4.19	3.60		9.26	.06	7.79	17.11
144	Andrews Dam	NPCO	1670		1.50	.87	.12			F	6.20		2.49		6.20	8.69
744	Myers Chapel	TVA	1960	T	1.25	2.50	1.10		.20	4.35	3.16	.02	4.85	.20	7.53	12.58
151	Hivasssee	TVA	1950		5.75	3.70		.12		F	7.52		9.45	.12	7.52	17.09
152	Glade Gap (R)	TVA	3800		3.07	2.58	1.08	.05	.10	5.20	1.87		6.73	.15	7.07	13.95
153	Little Hightower	TVA	2230	.12	4.07	3.29	.82	.35	.02	3.75	3.56		8.30	.37	7.31	15.98
574	Titus	TVA	2180	.09	4.73	3.00	1.14	.20		4.30	2.34		8.96	.20	6.64	15.80
574A	Titus (Radio)	TVA	2200		4.5	2.8	1.3	.2		3.5	3.6		8.6	.2	7.1	15.9
154	Fray Mountain (R)	TVA	3900	.57	#4.08	#3.10	#1.15	.09	.43	6.22	4.89		#8.90	.52	11.11	#20.53
569	Mountain Scene (Radio)	TVA	2070	.1	3.2	2.5	1.2		.1	2.2	4.7		7.0	.1	6.9	14.0

Rainfall is for 24 hours, observed at morning, except as follows:
 (X) at evening.

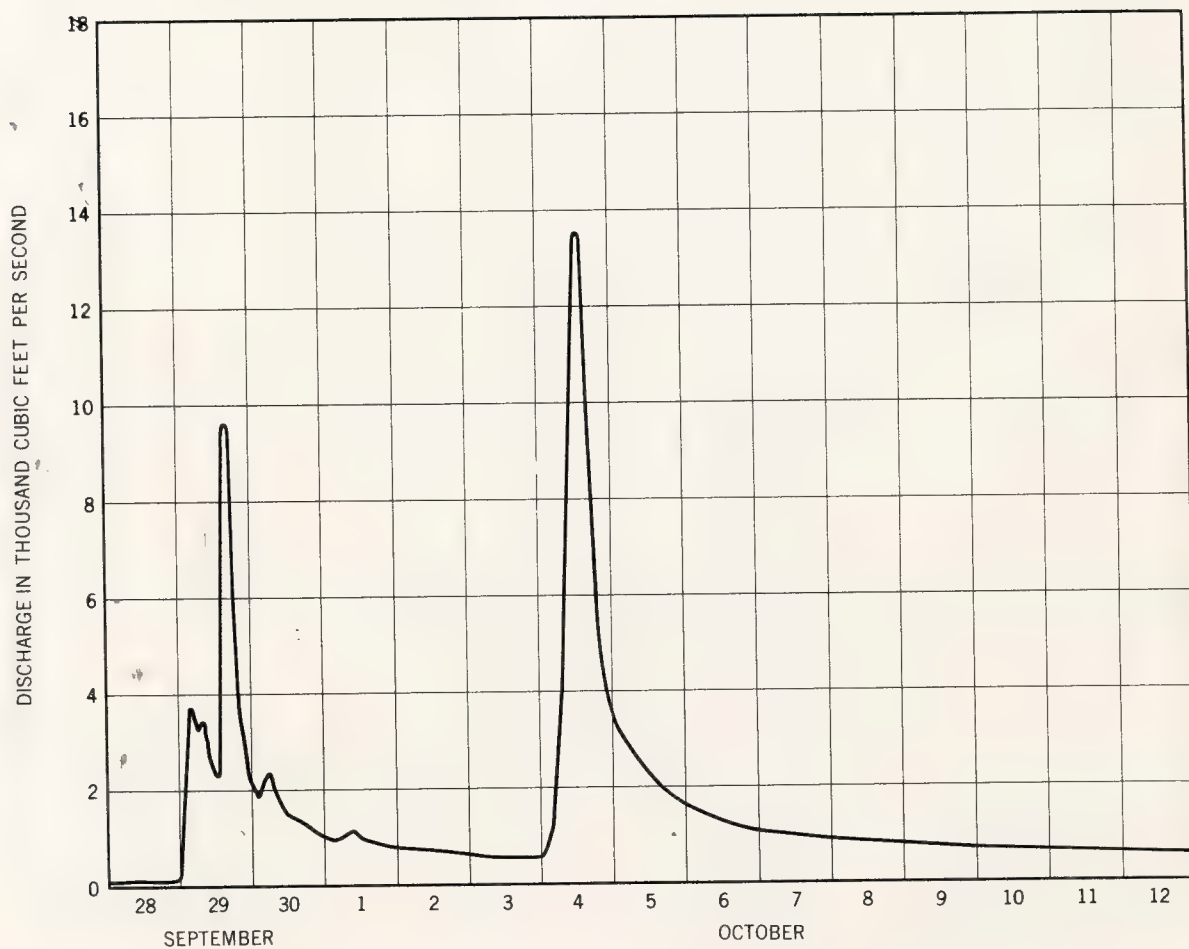
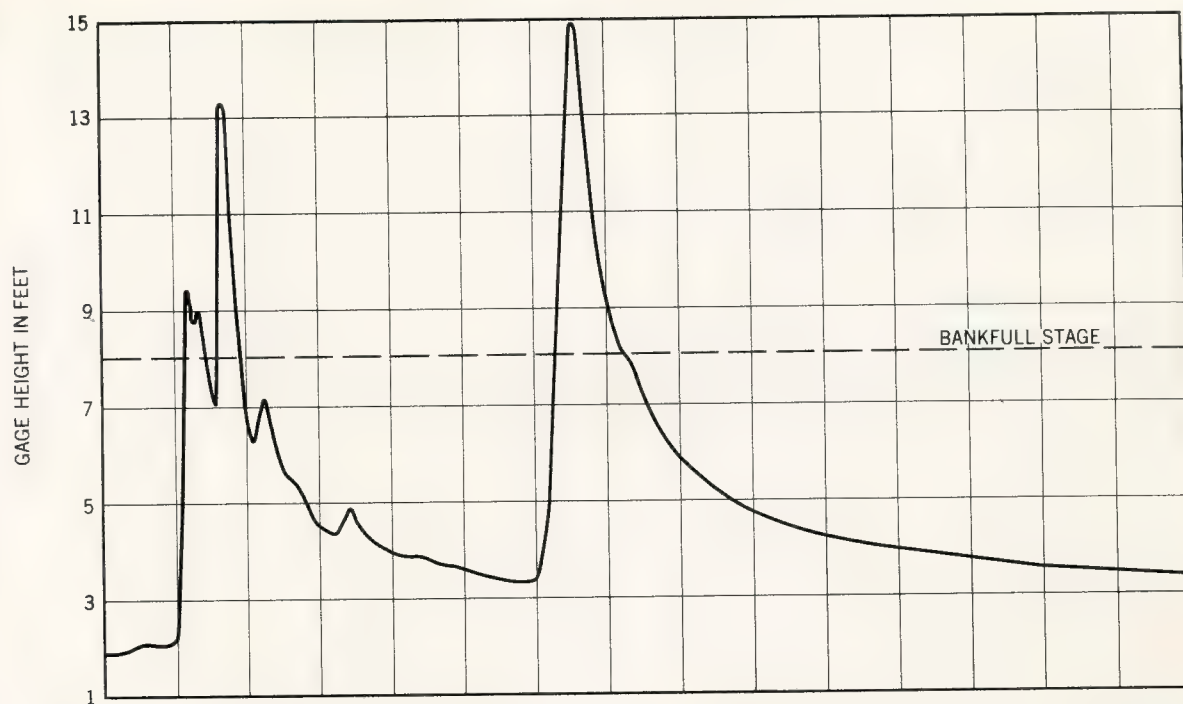
- (a) Includes rainfall reported on October 1.
 (b) Includes rainfall reported on October 6.
 R Recording gage.
 F Included in next measurement.
 # Interpolated or partly interpolated.
 T Indicates less than 0.01 inch.

APPENDIX C

STREAM STAGE AND DISCHARGE HYDROGRAPHS

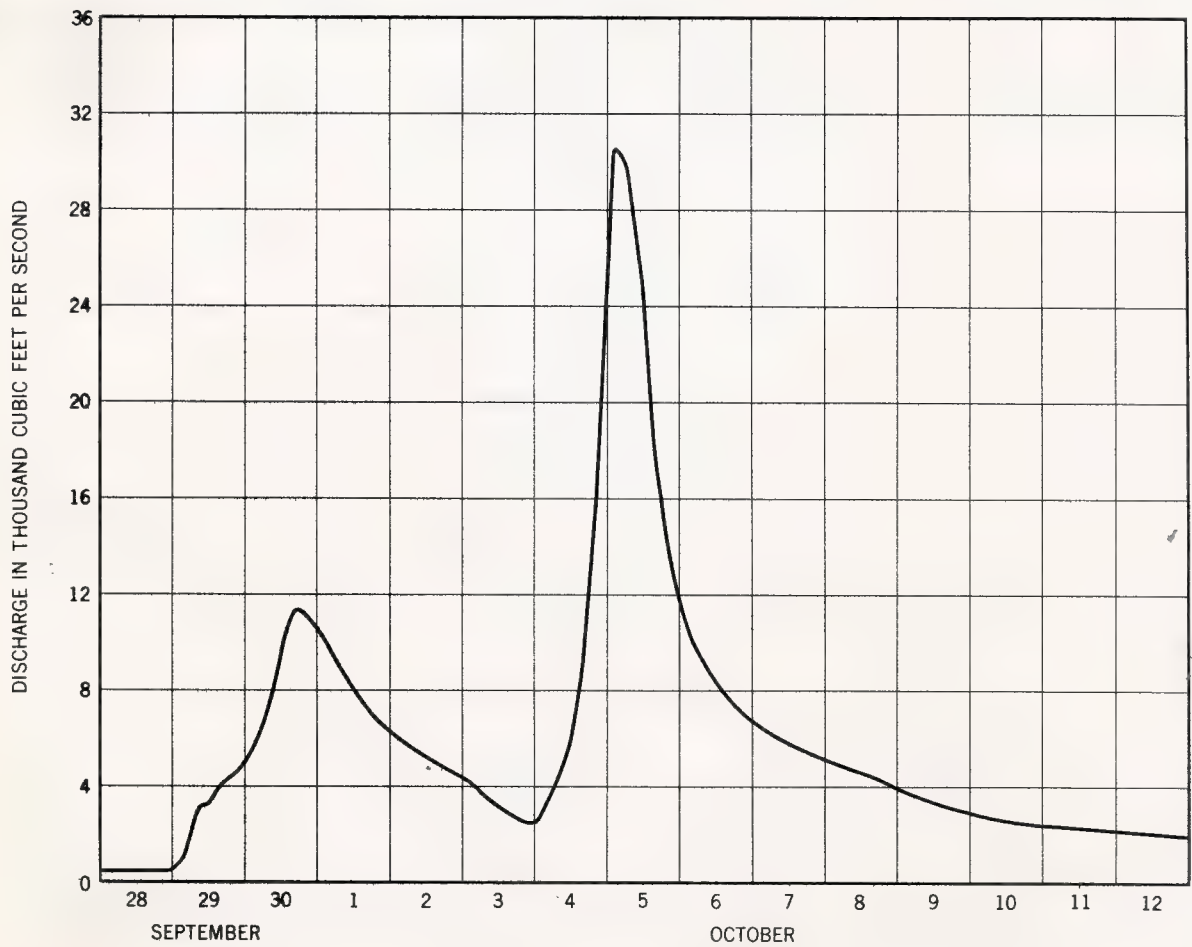
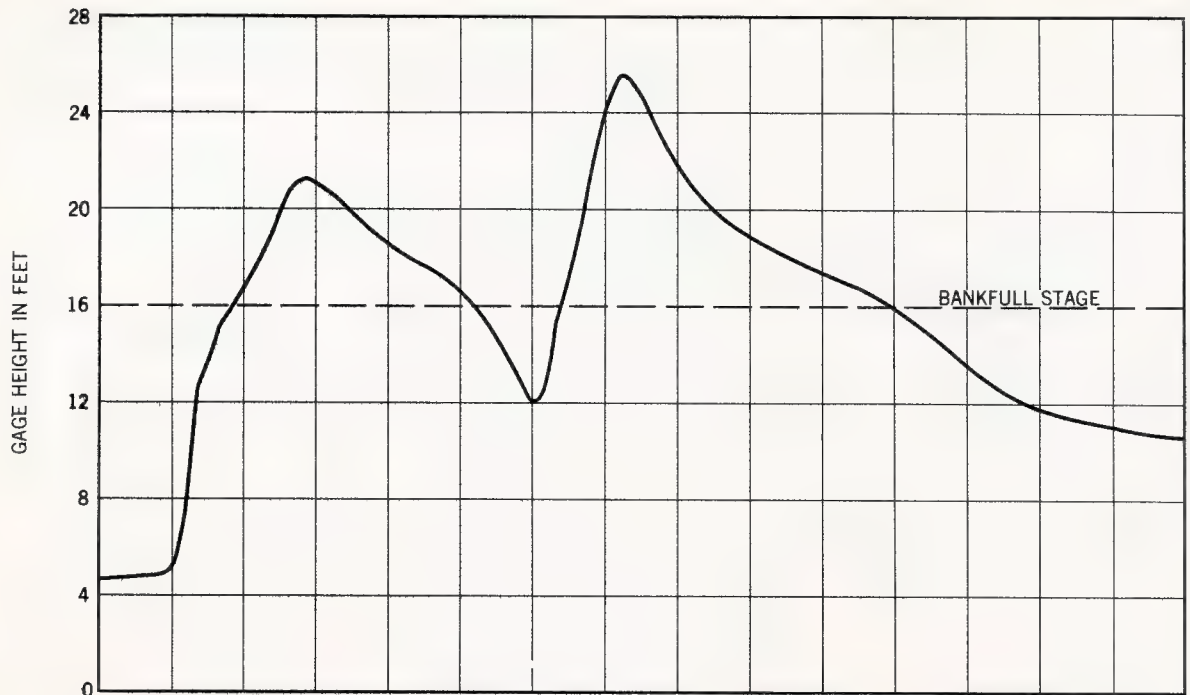
IN THE UPPER

FRENCH BROAD, LITTLE TENNESSEE, AND HIWASSEE RIVER BASINS



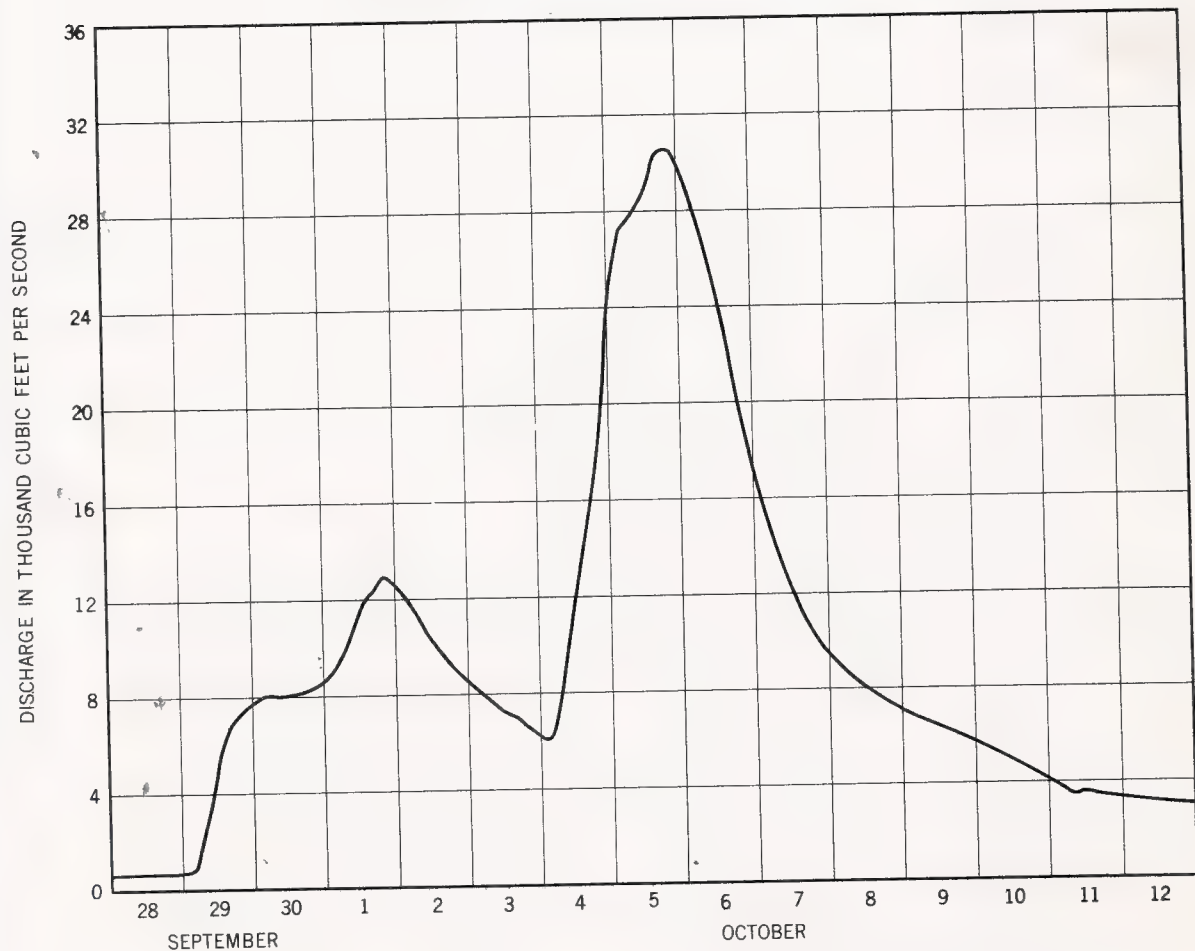
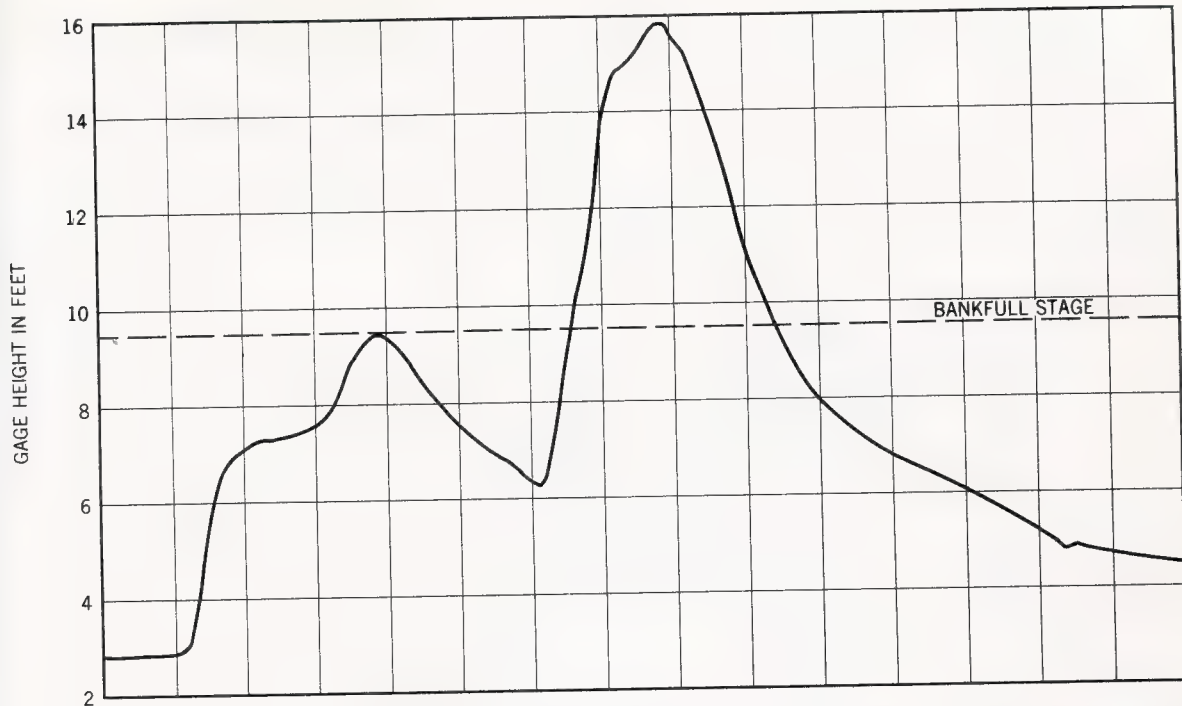
FLOODS OF SEPTEMBER-OCTOBER 1964
FRENCH BROAD RIVER AT ROSMAN, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 2,173.83



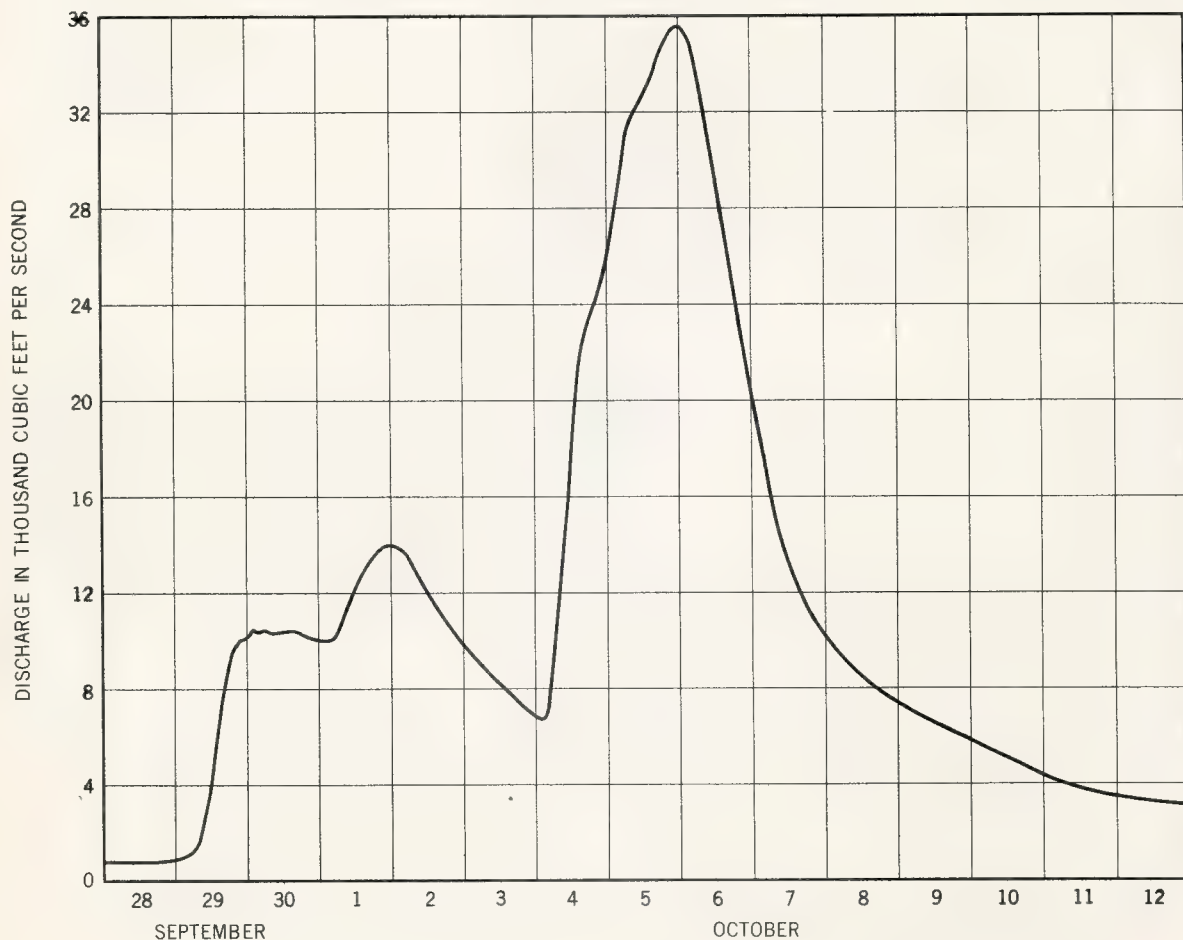
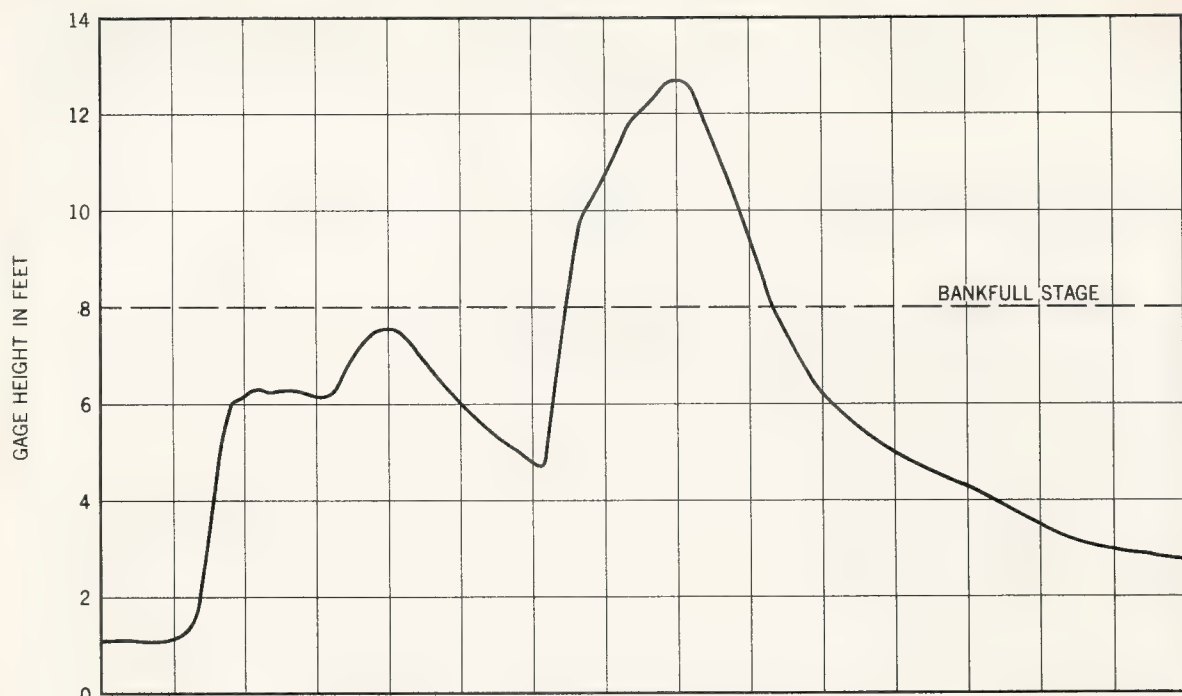
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FRENCH BROAD RIVER AT BLANTYRE, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 2,060.32



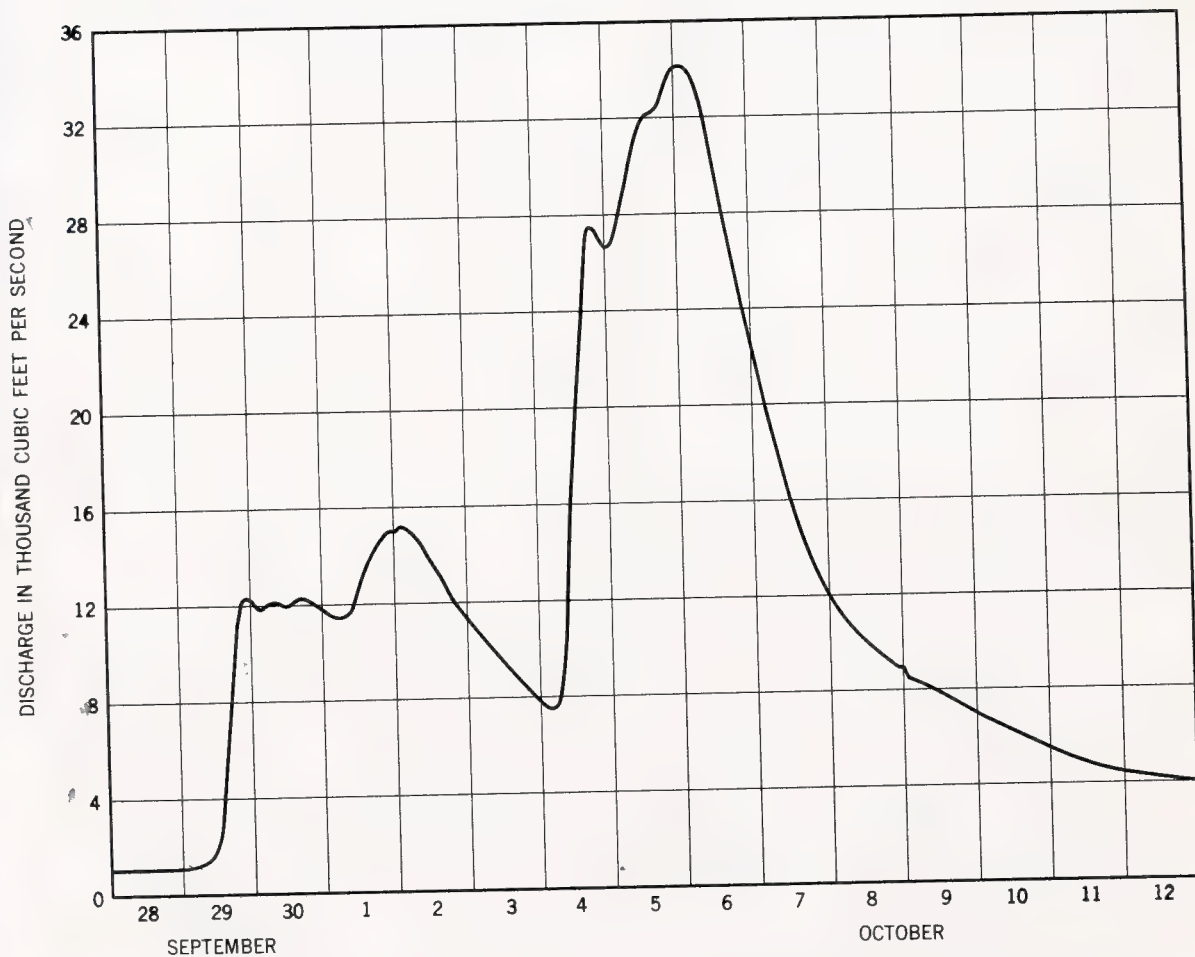
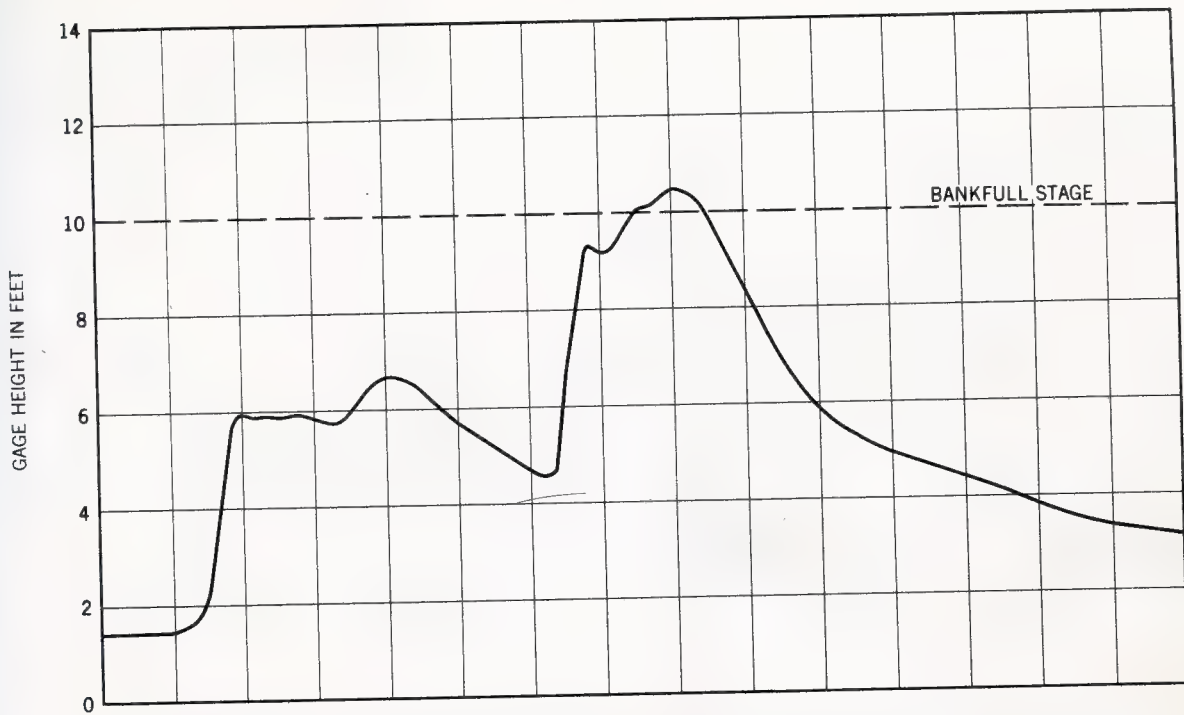
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FRENCH BROAD RIVER AT BENT CREEK, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,995.91



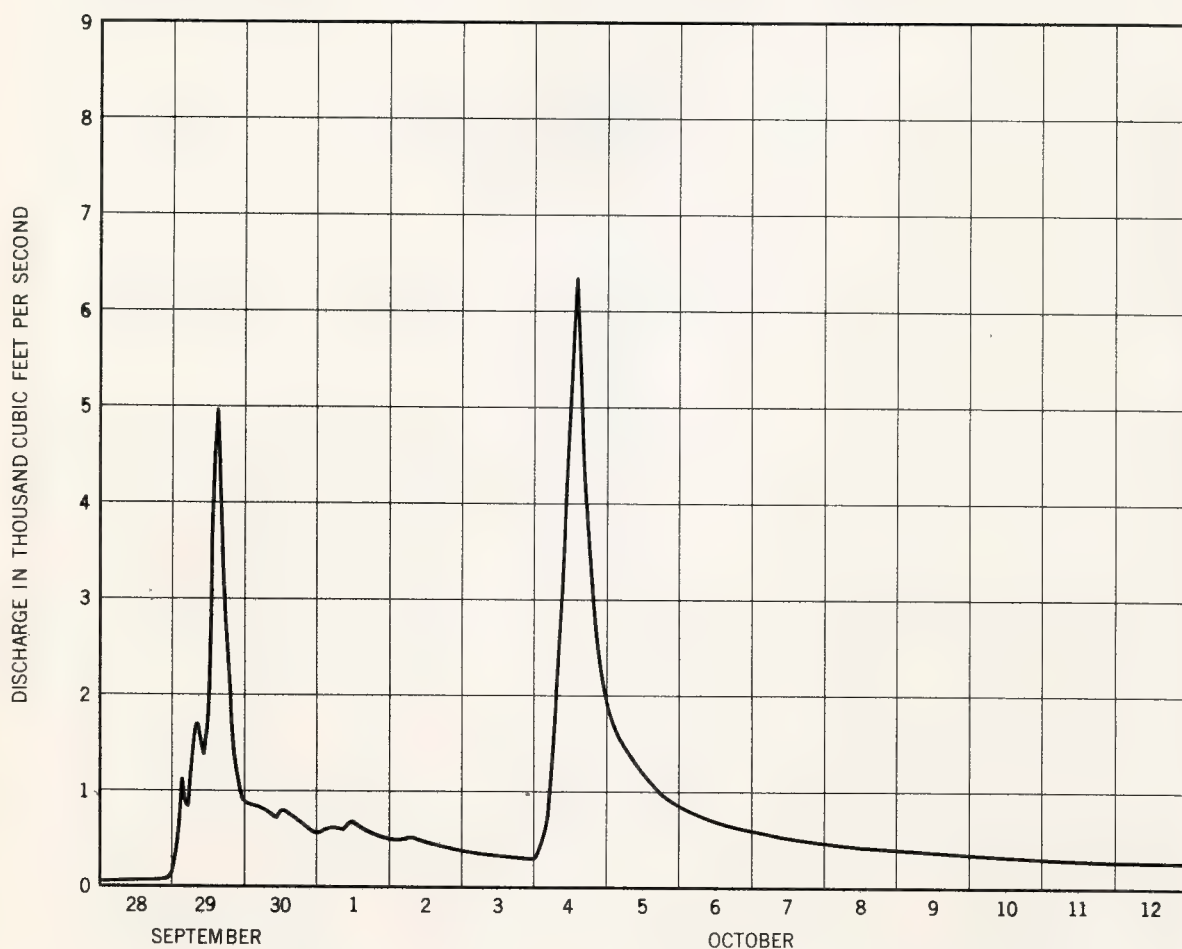
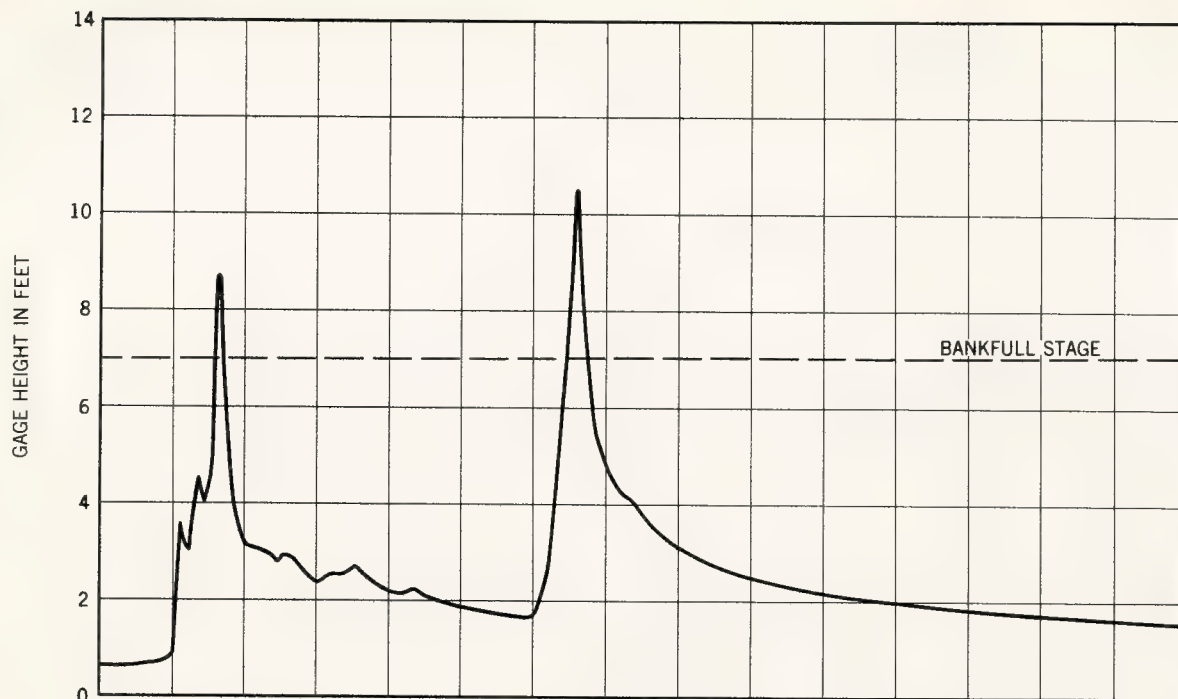
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FRENCH BROAD RIVER AT ASHEVILLE, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,950.28



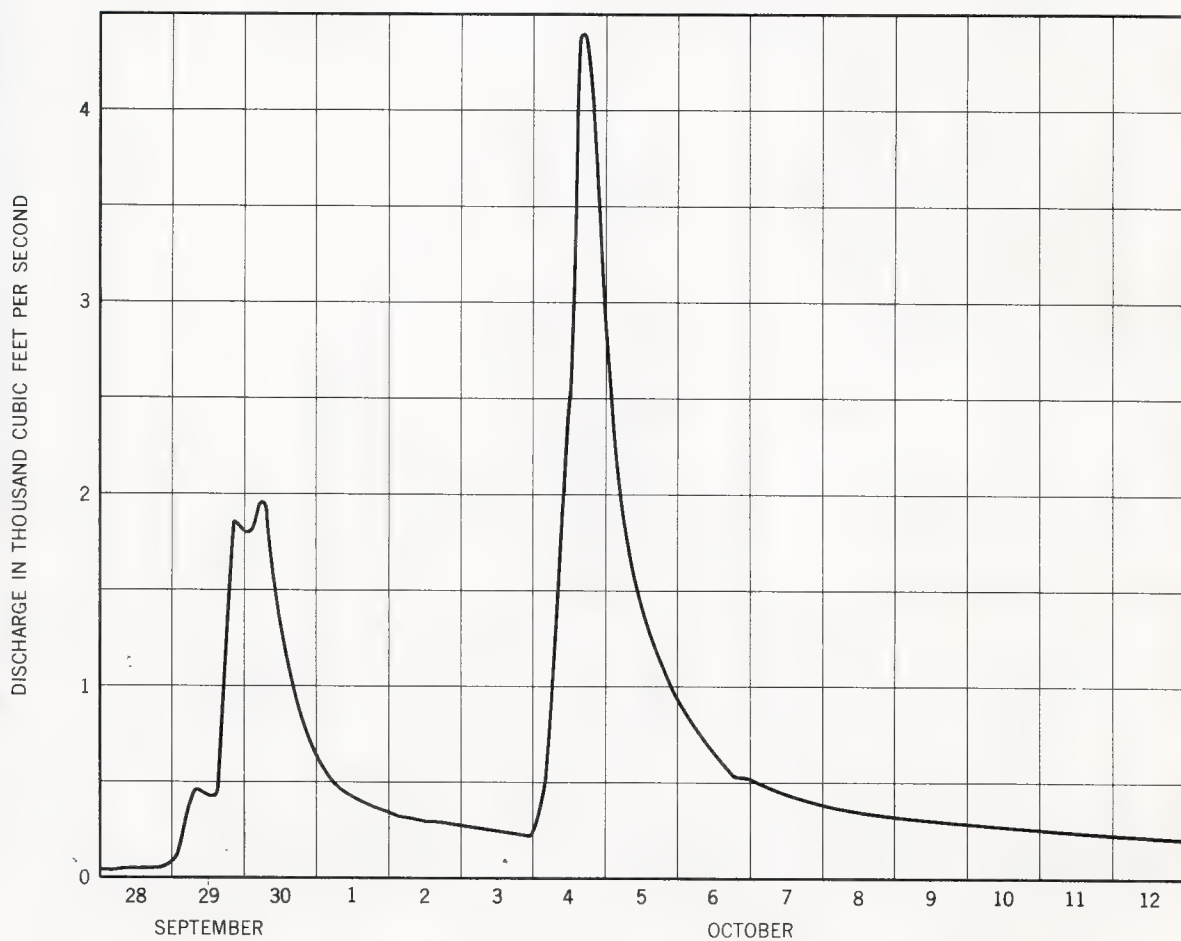
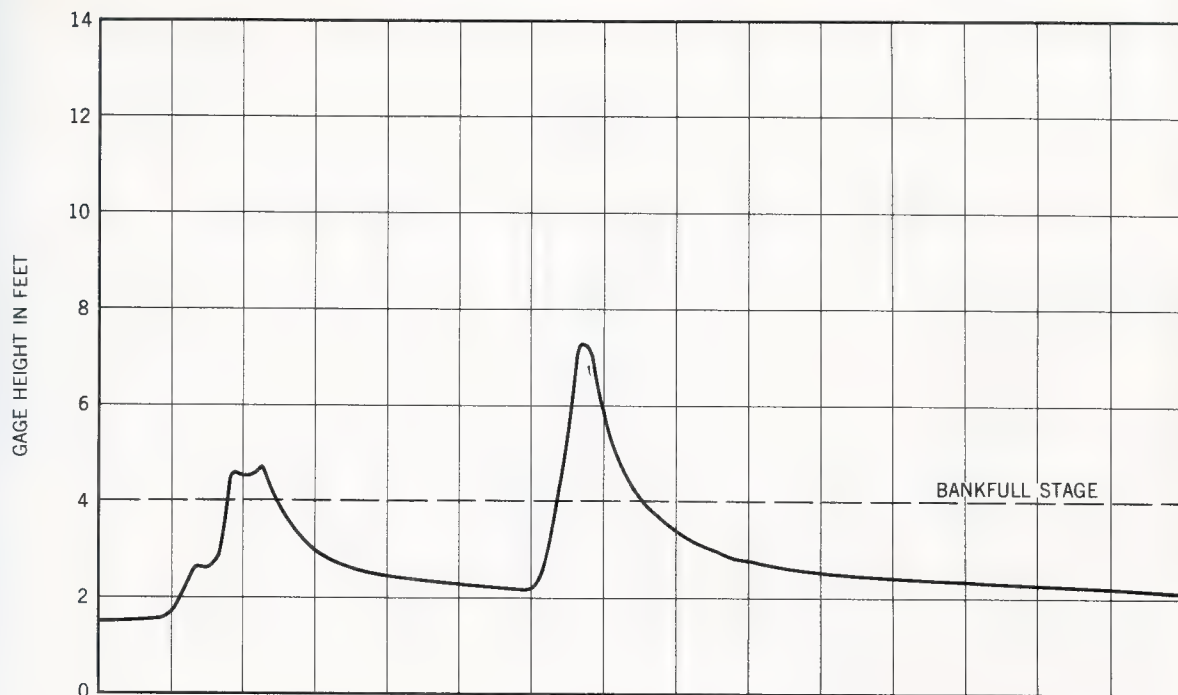
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FRENCH BROAD RIVER AT MARSHALL, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,646.79



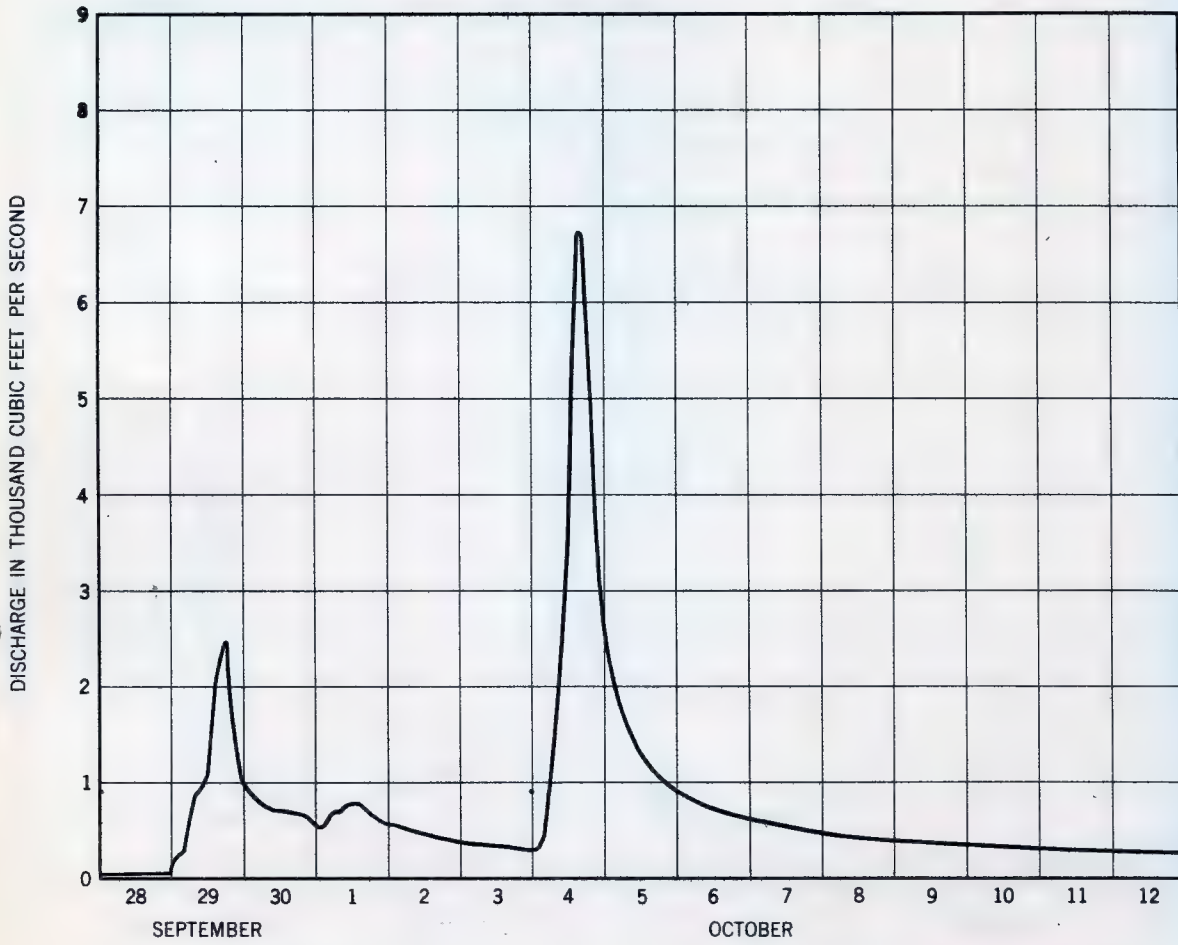
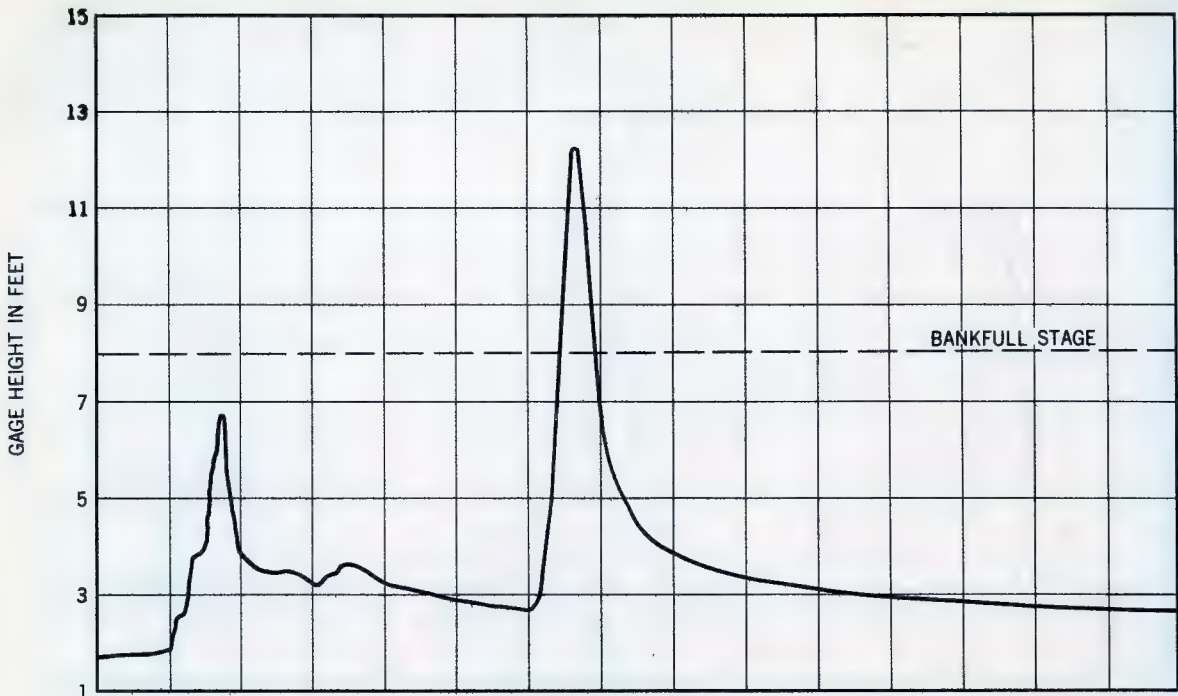
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DAVIDSON RIVER NEAR BREVARD, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 2,115.13



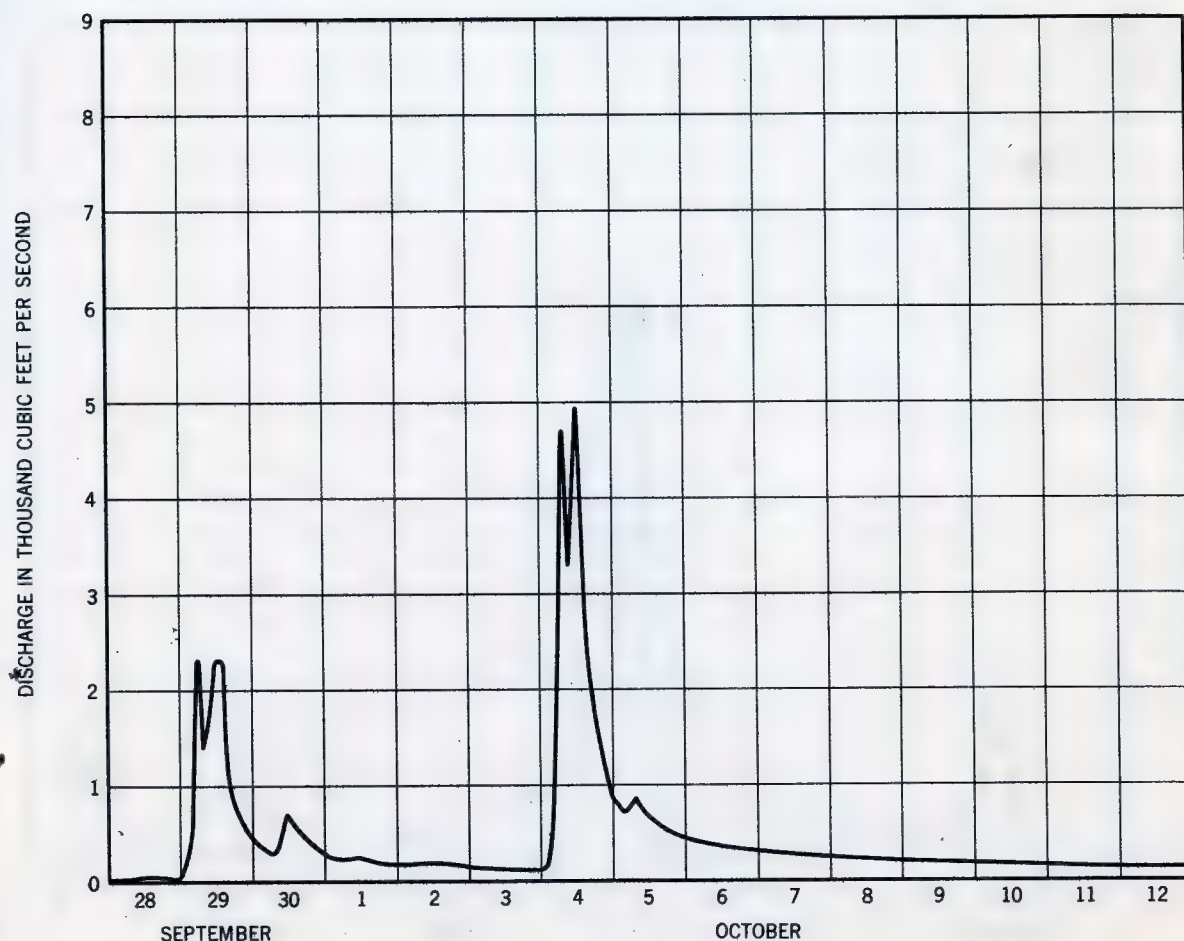
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 LITTLE RIVER NEAR CEDAR MOUNTAIN, N.C.
 STREAM STAGES AND DISCHARGES

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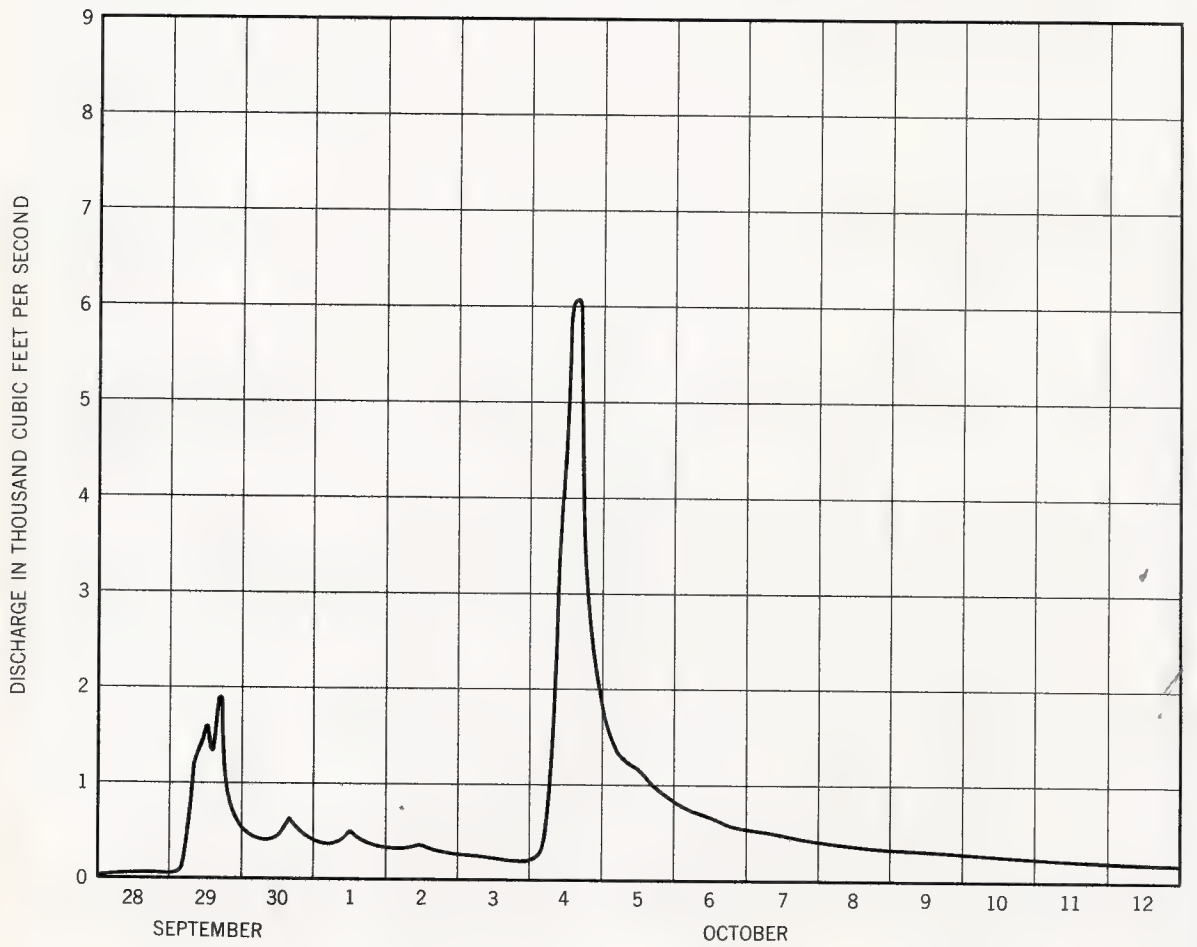
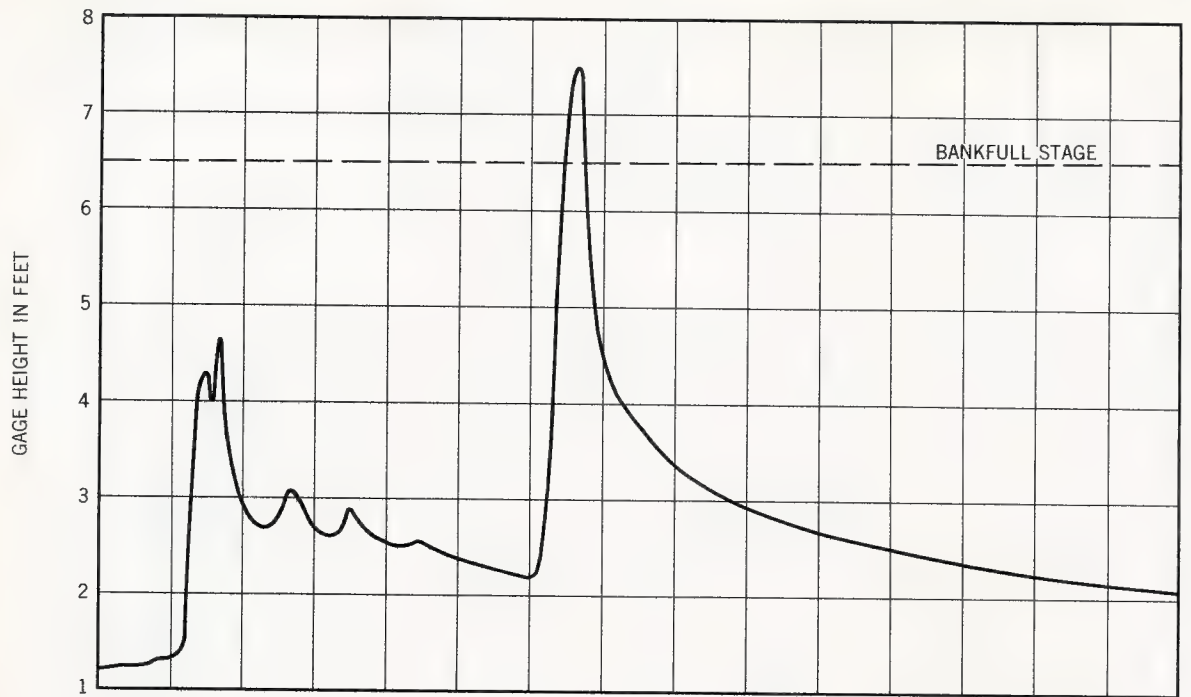
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MILLS RIVER NEAR MILLS RIVER, N.C.
STREAM STAGES AND DISCHARGES

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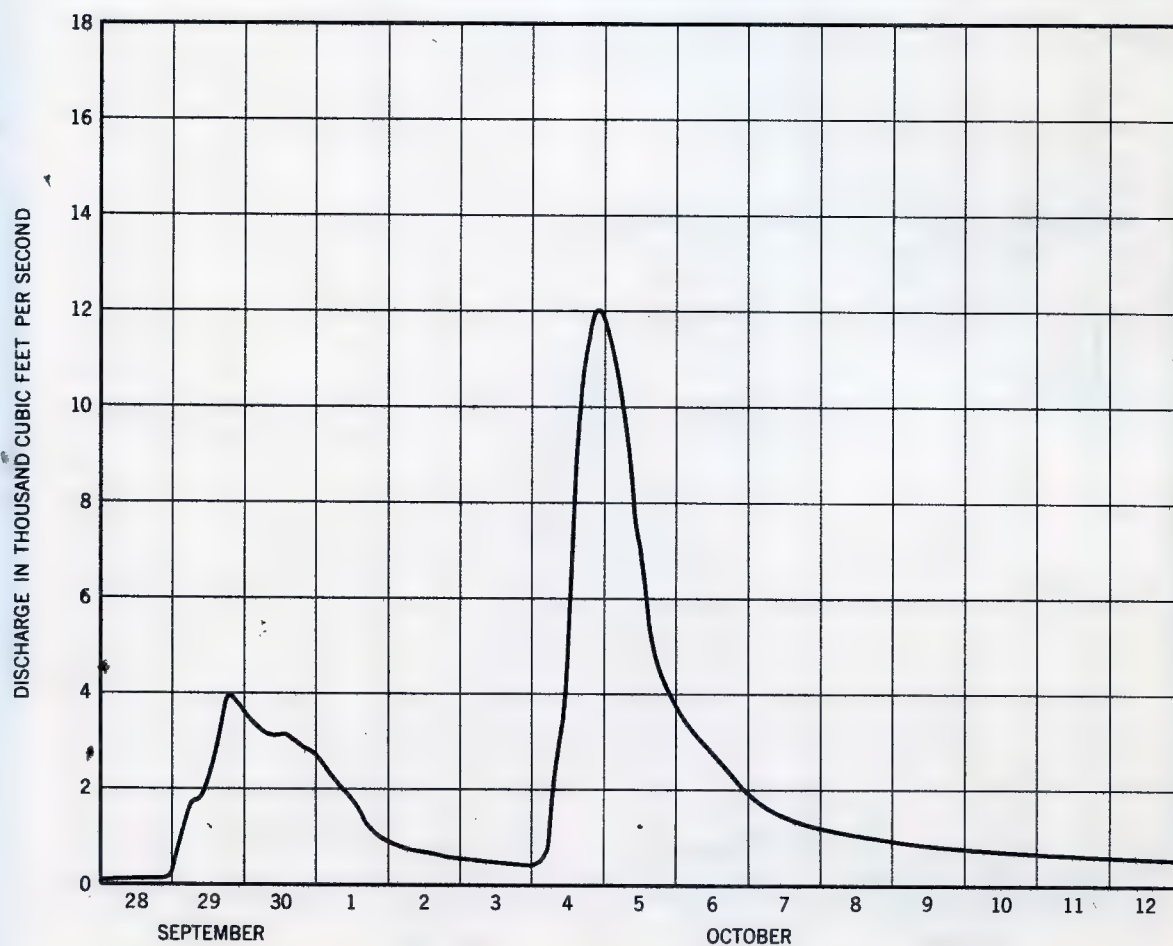
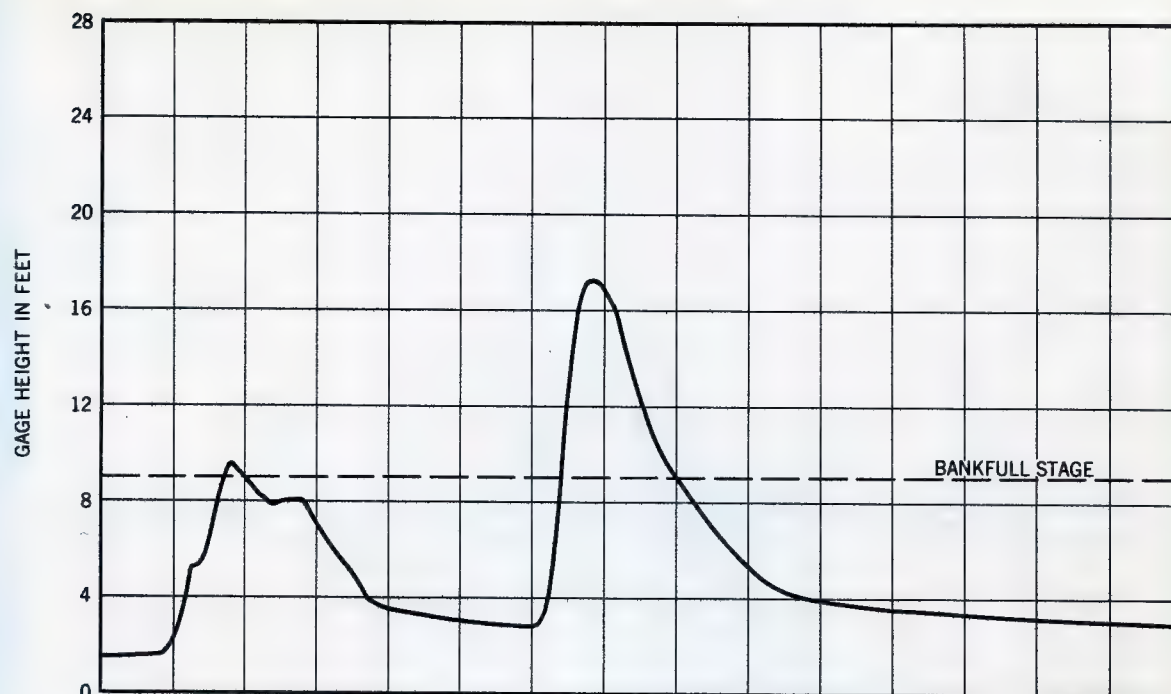
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W. FORK PIGEON RIVER ABOVE LAKE LOGAN, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 2,976.00



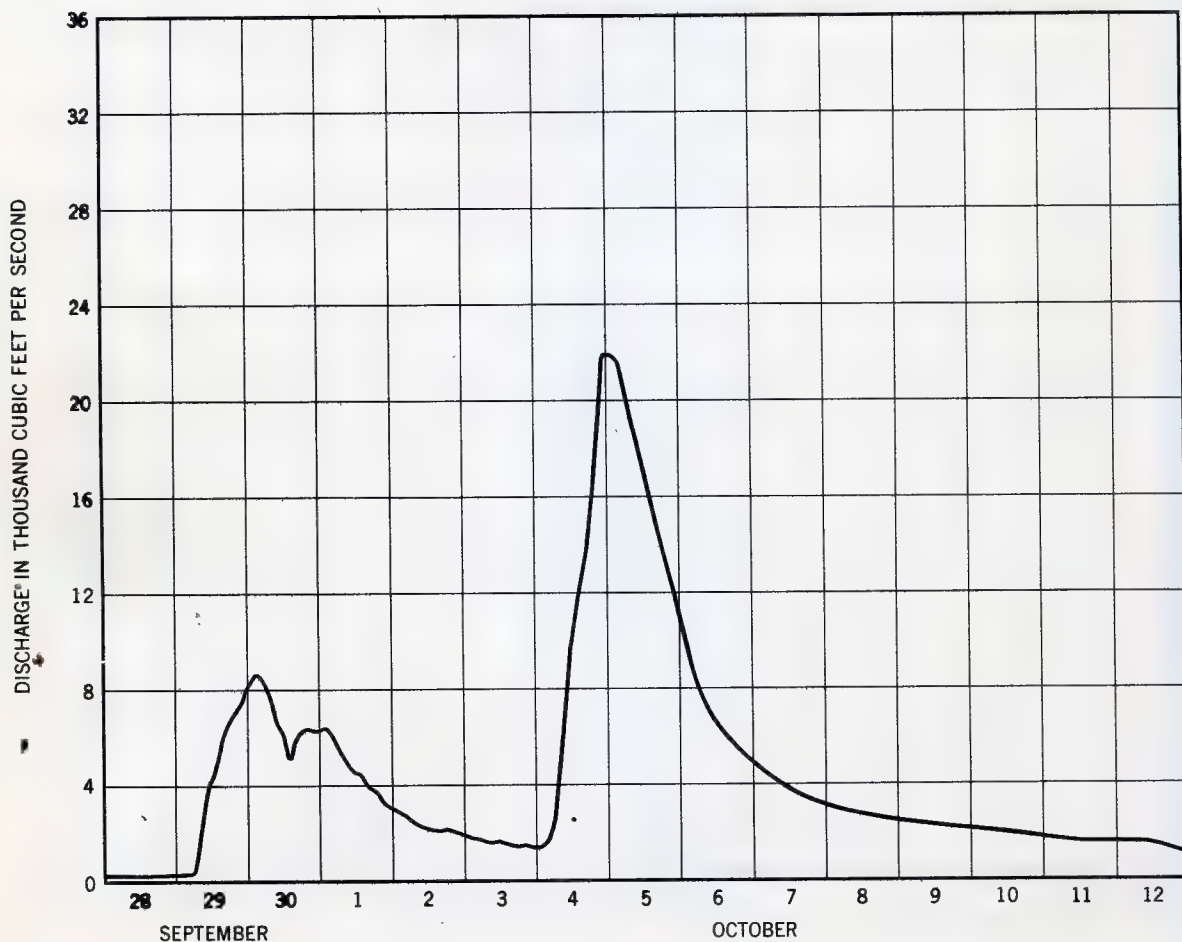
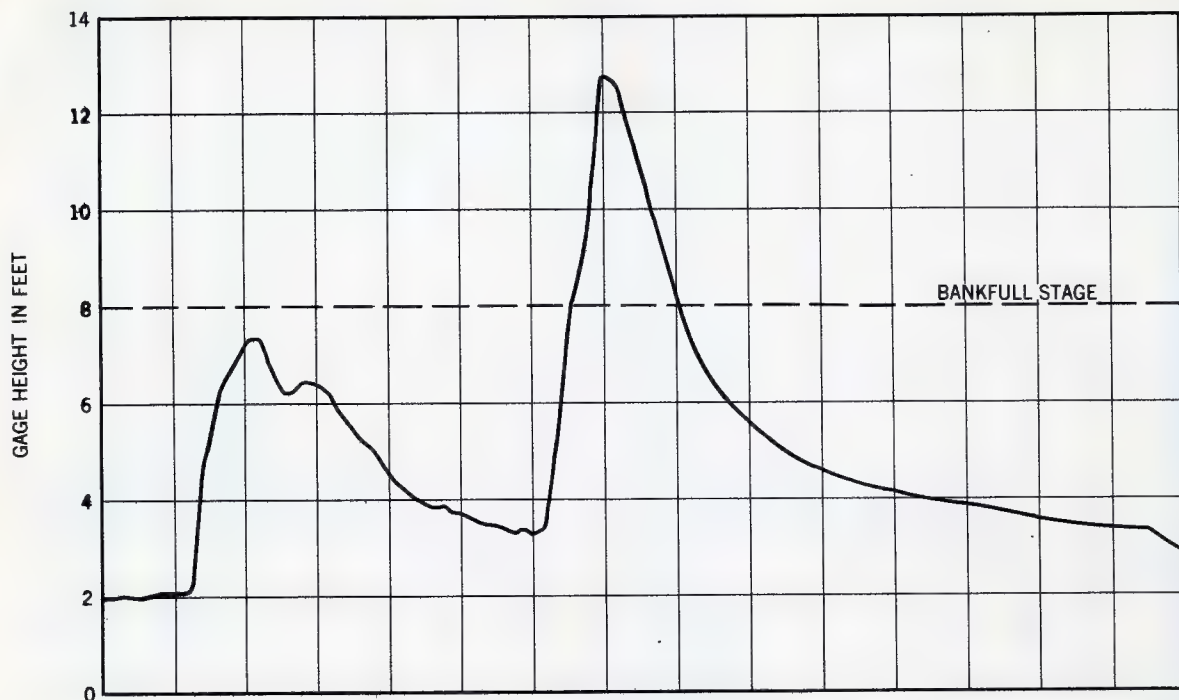
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E. FORK PIGEON RIVER NEAR CANTON, N.C.
STREAM STAGES AND DISCHARGES

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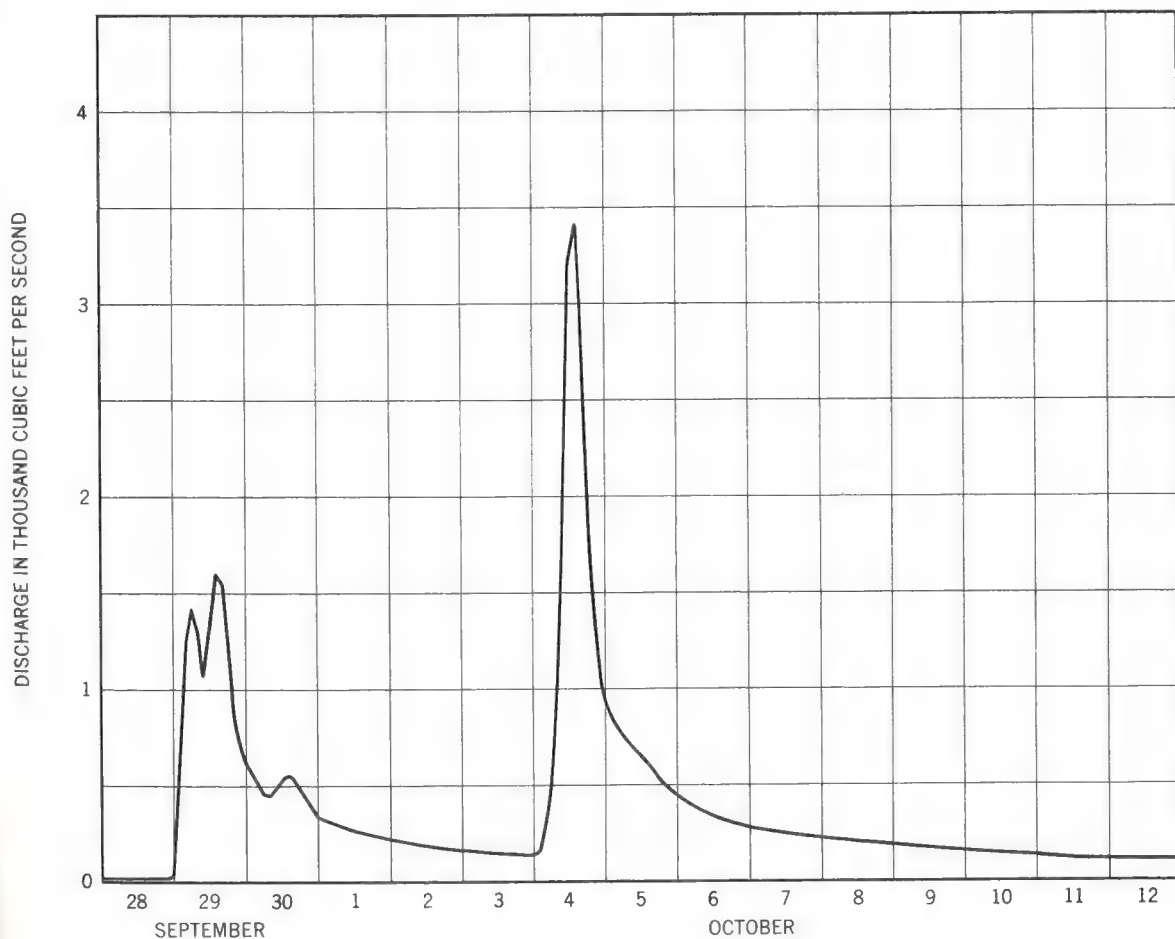
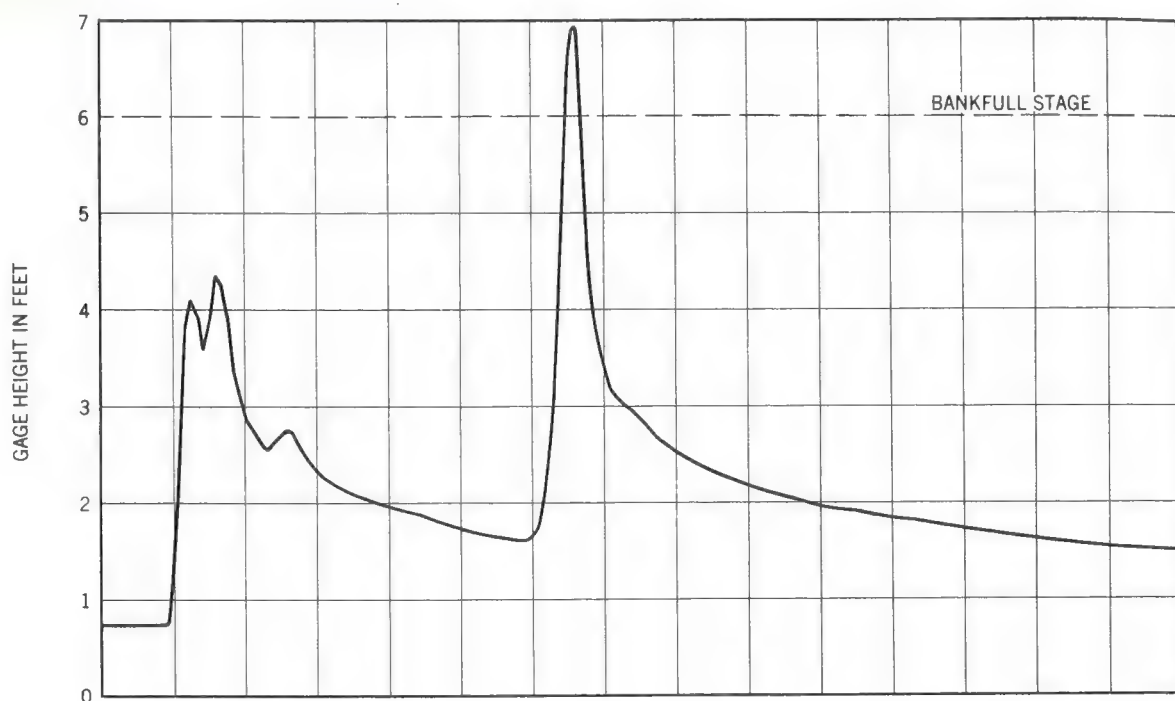
FLOODS OF SEPTEMBER-OCTOBER 1964
 LITTLE TENNESSEE RIVER NEAR PRENTISS, N.C.
 STREAM STAGES AND DISCHARGES

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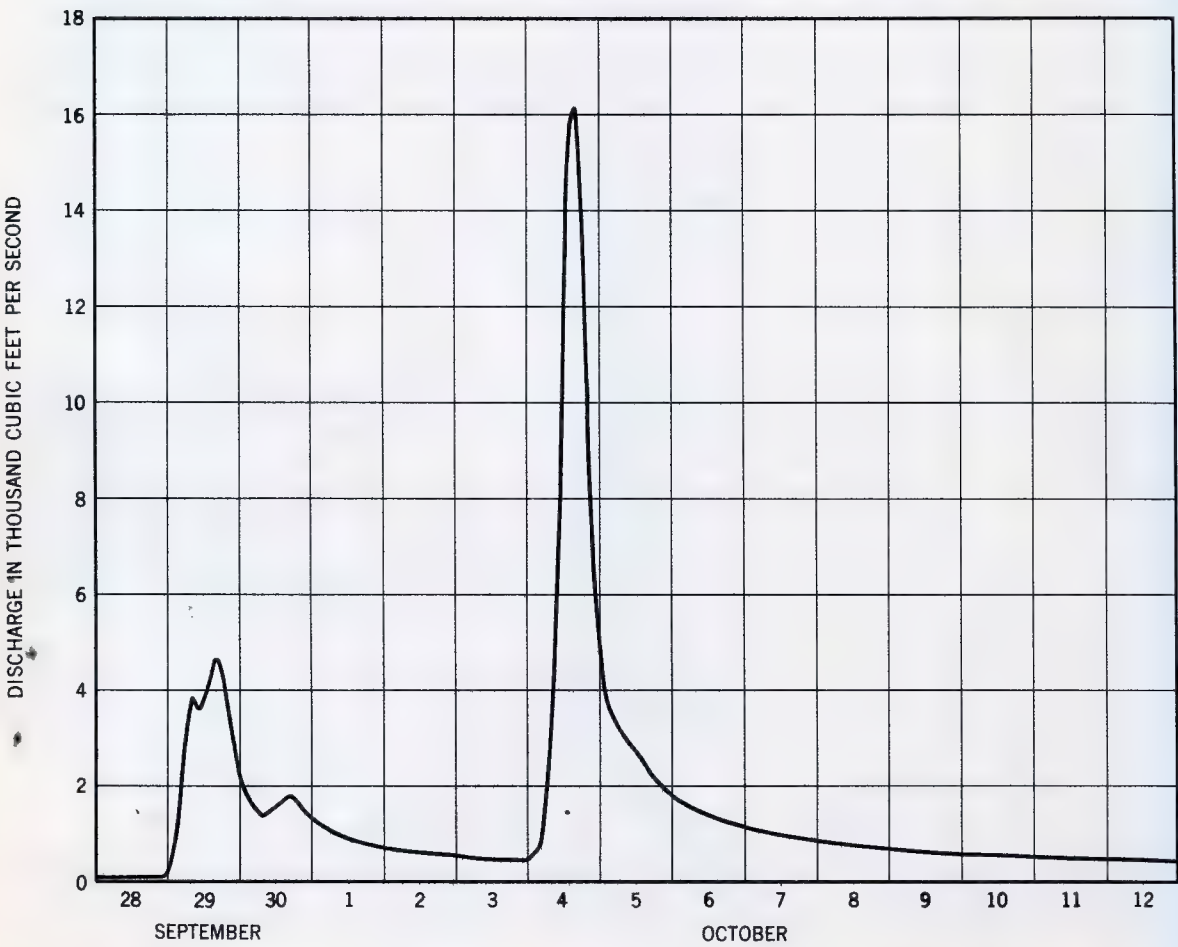
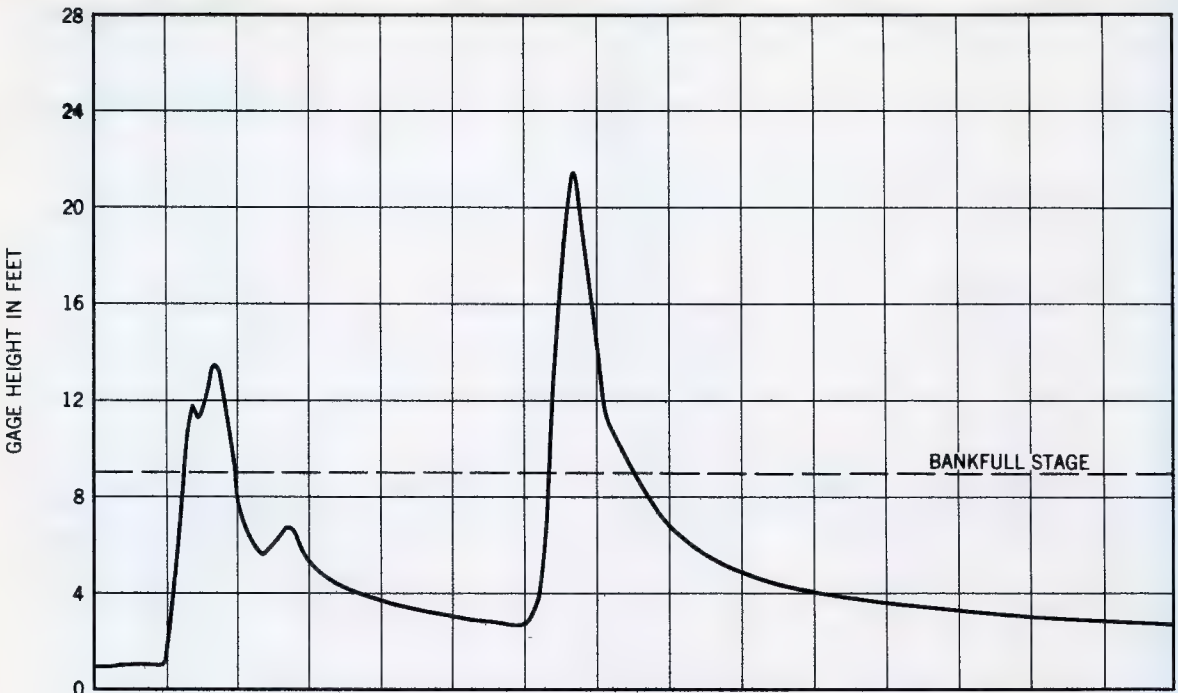
FLOODS OF SEPTEMBER-OCTOBER 1964
LITTLE TENNESSEE RIVER AT NEEDMORE, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,761.19



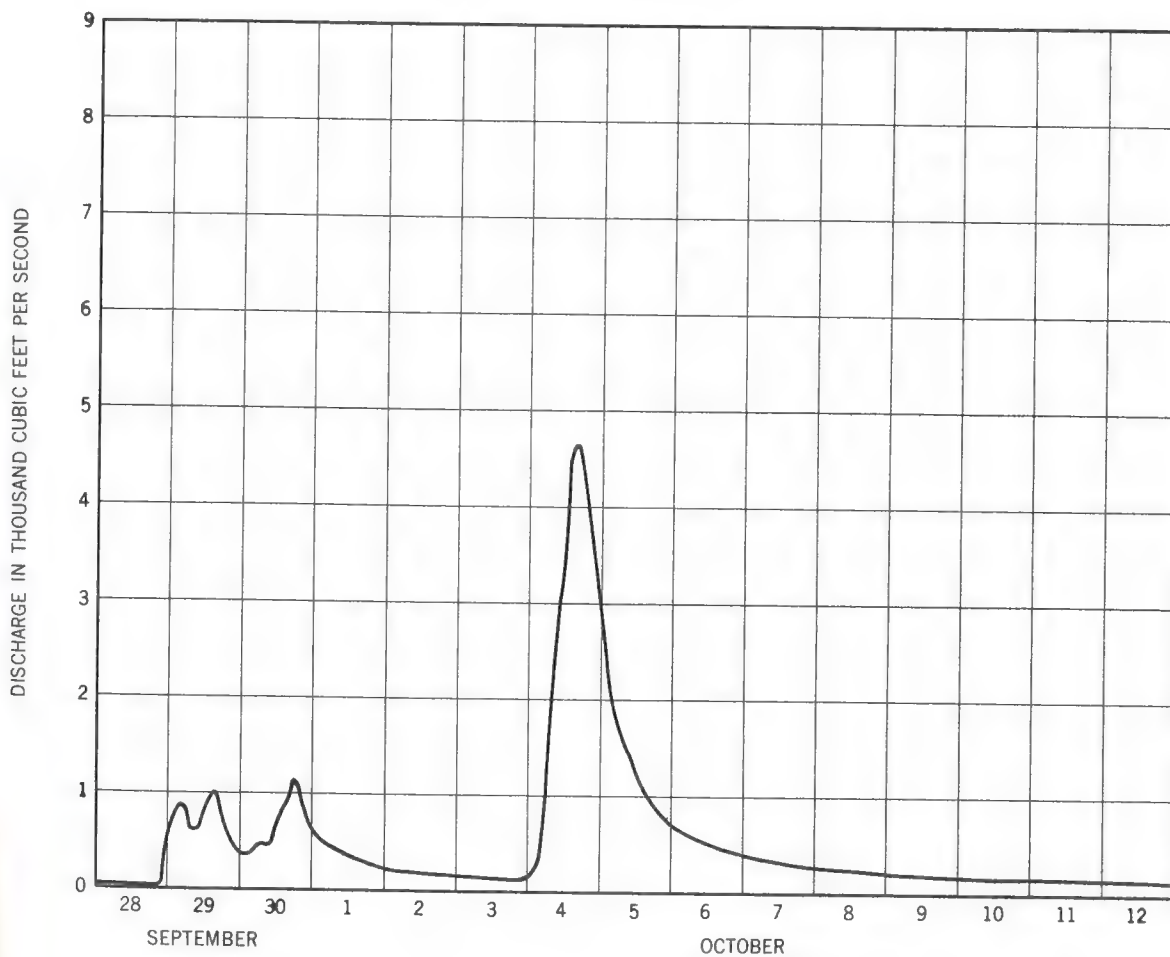
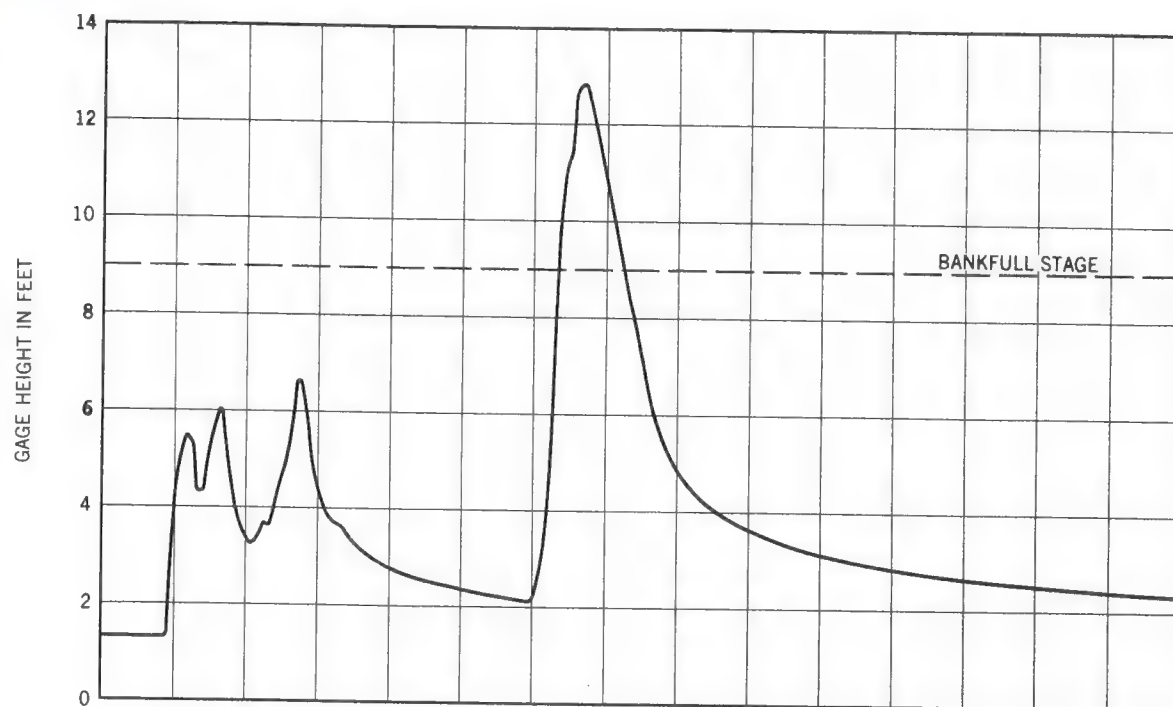
FLOODS OF SEPTEMBER-OCTOBER 1964
CULLASAJA RIVER AT HIGHLANDS, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 3,373.63



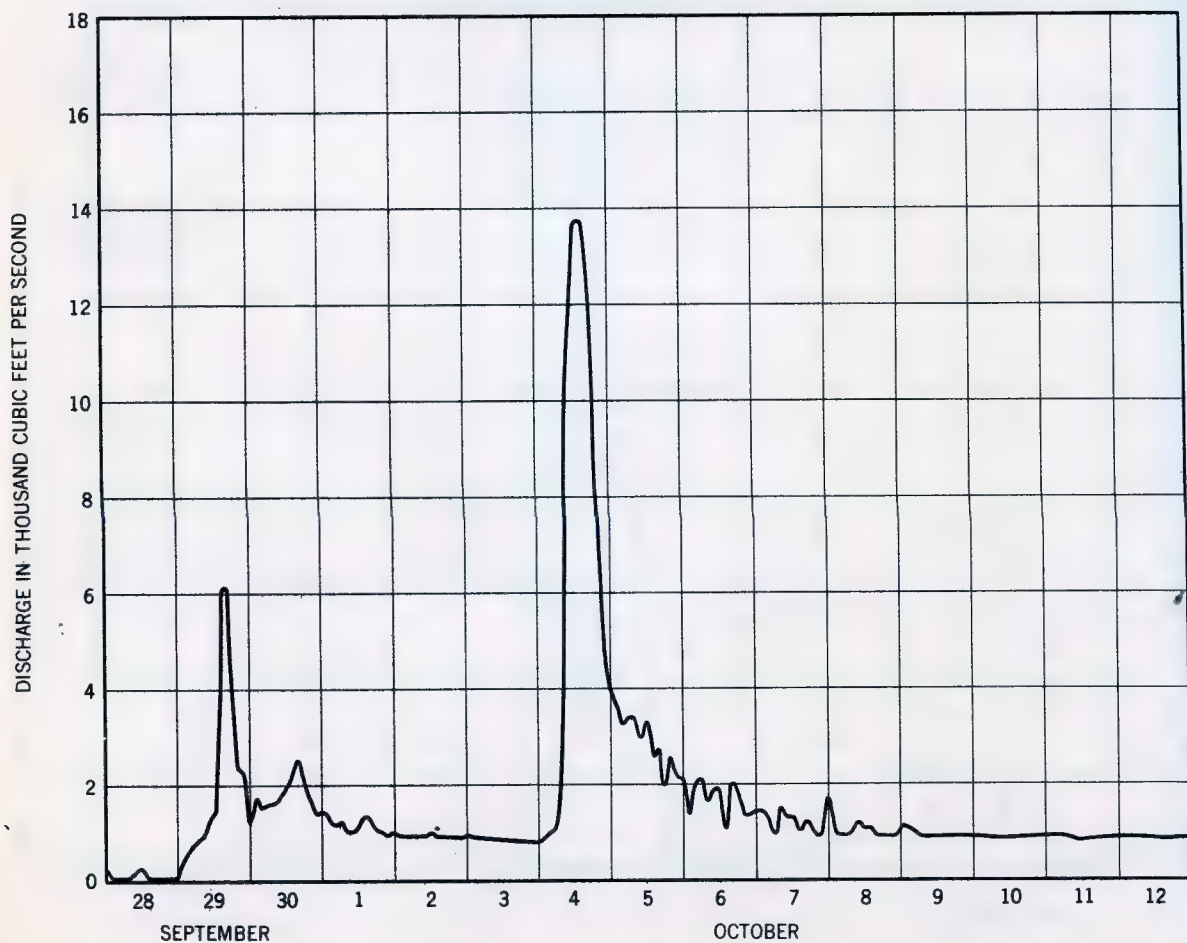
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CULLASAJA RIVER AT CULLASAJA, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 2,023.37



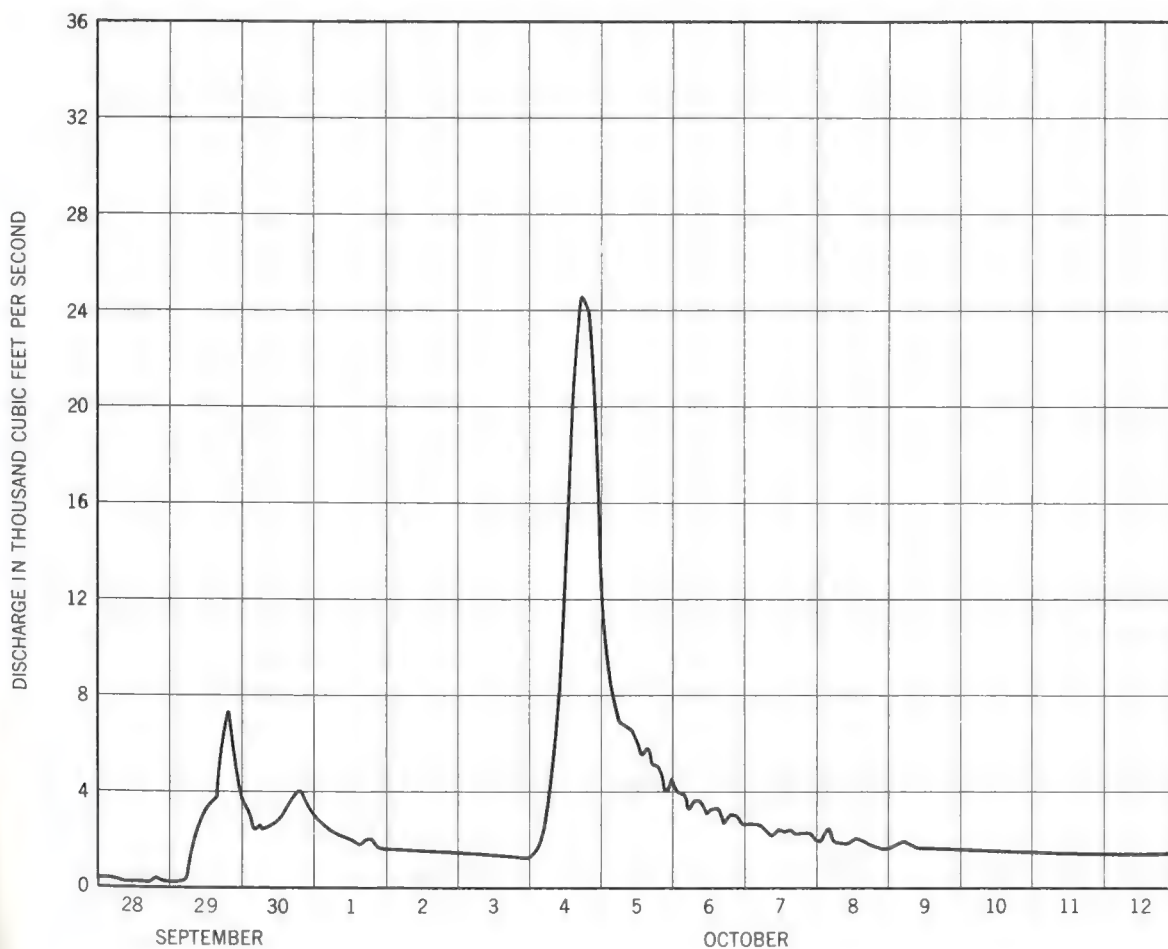
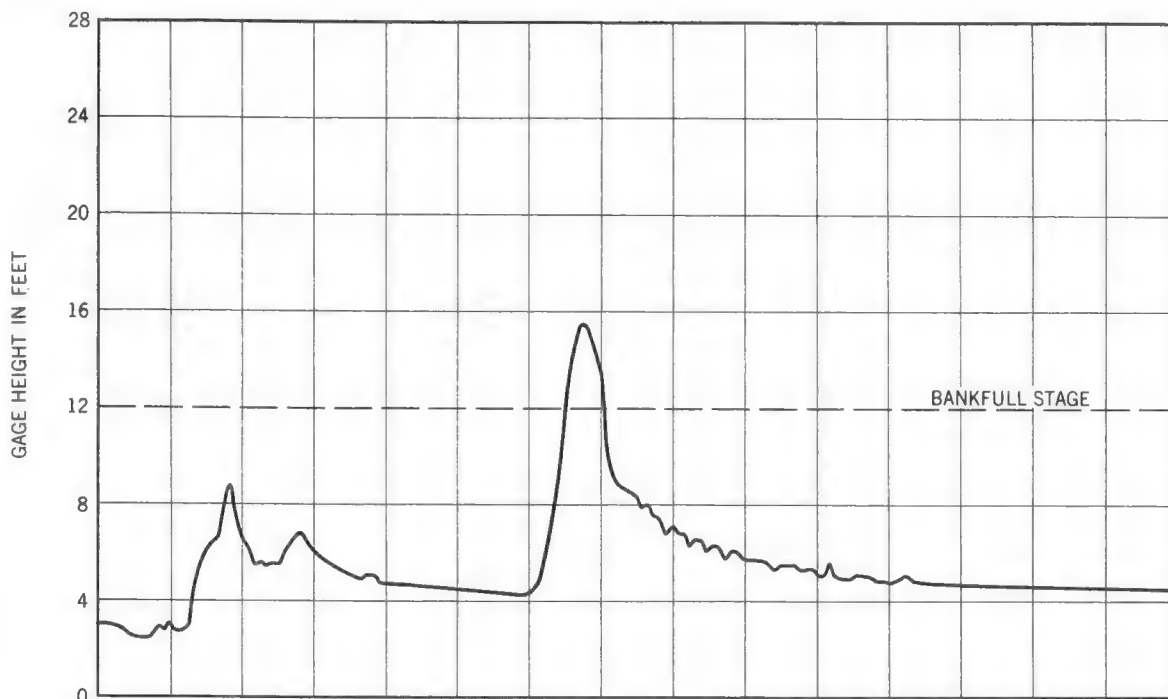
FLOODS OF SEPTEMBER-OCTOBER 1964
 CARTOOGECCHAYE CREEK NEAR FRANKLIN, N.C.
 STREAM STAGES AND DISCHARGES

GAGE ZERO 2,017.18



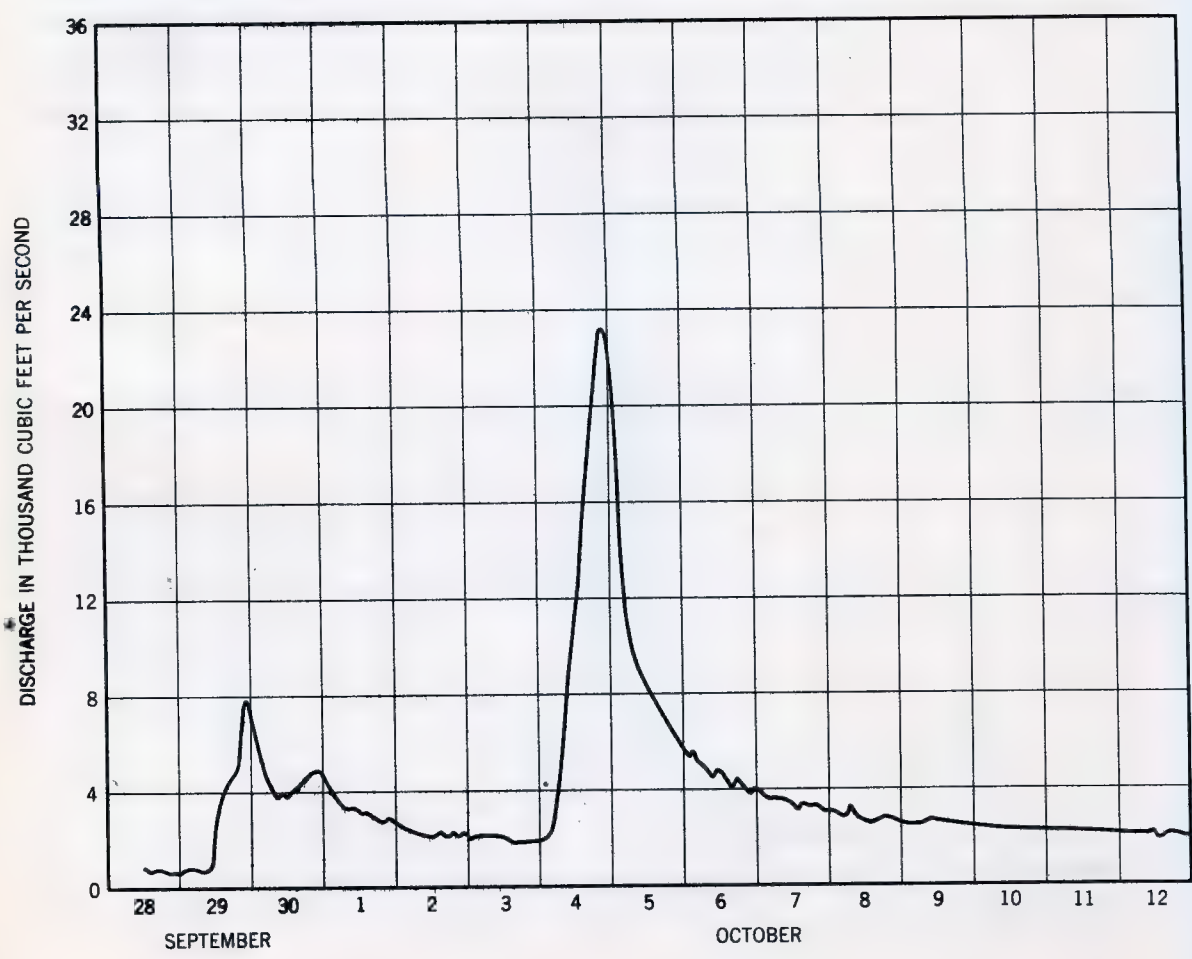
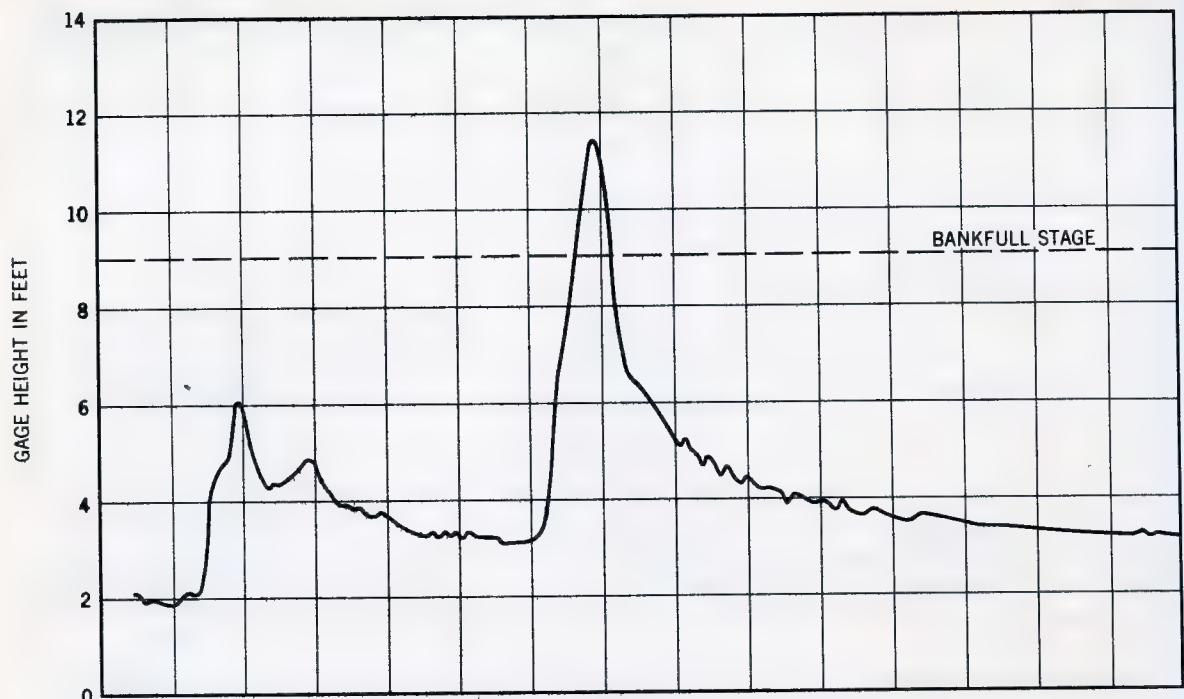
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TUCKASEGEE RIVER AT TUCKASEGEE, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 2,125.16



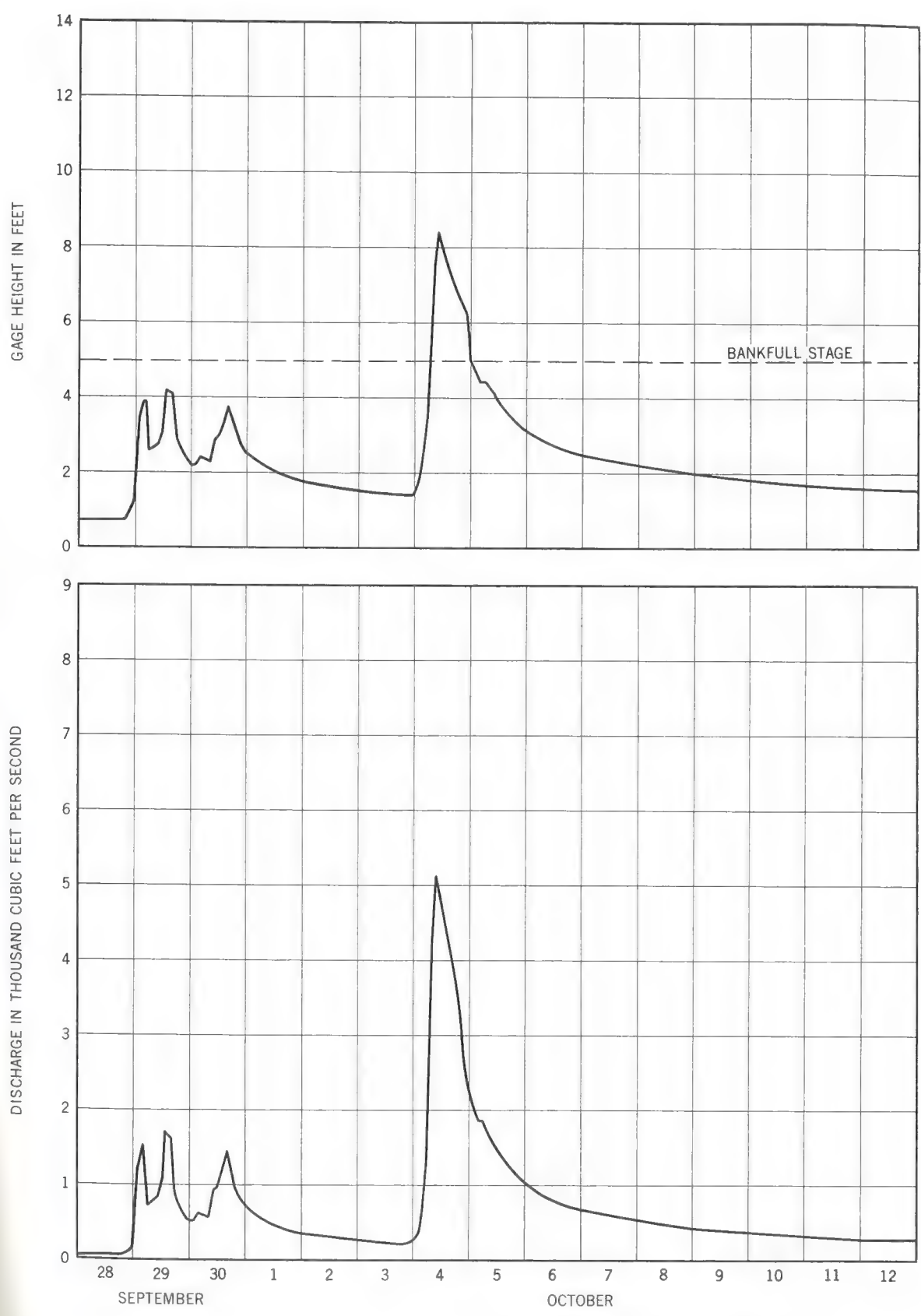
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TUCKASEGEE RIVER AT DILLSBORO, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,950.15



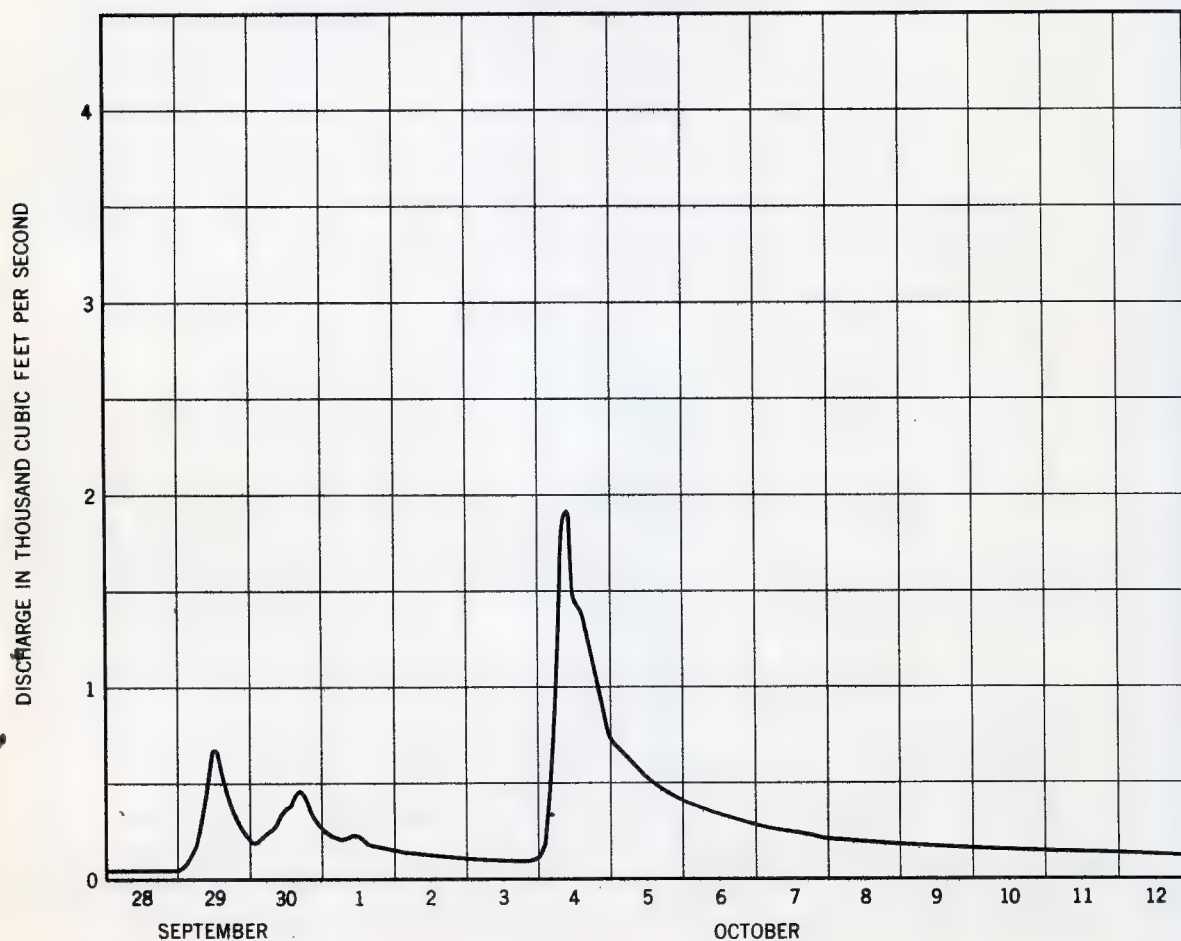
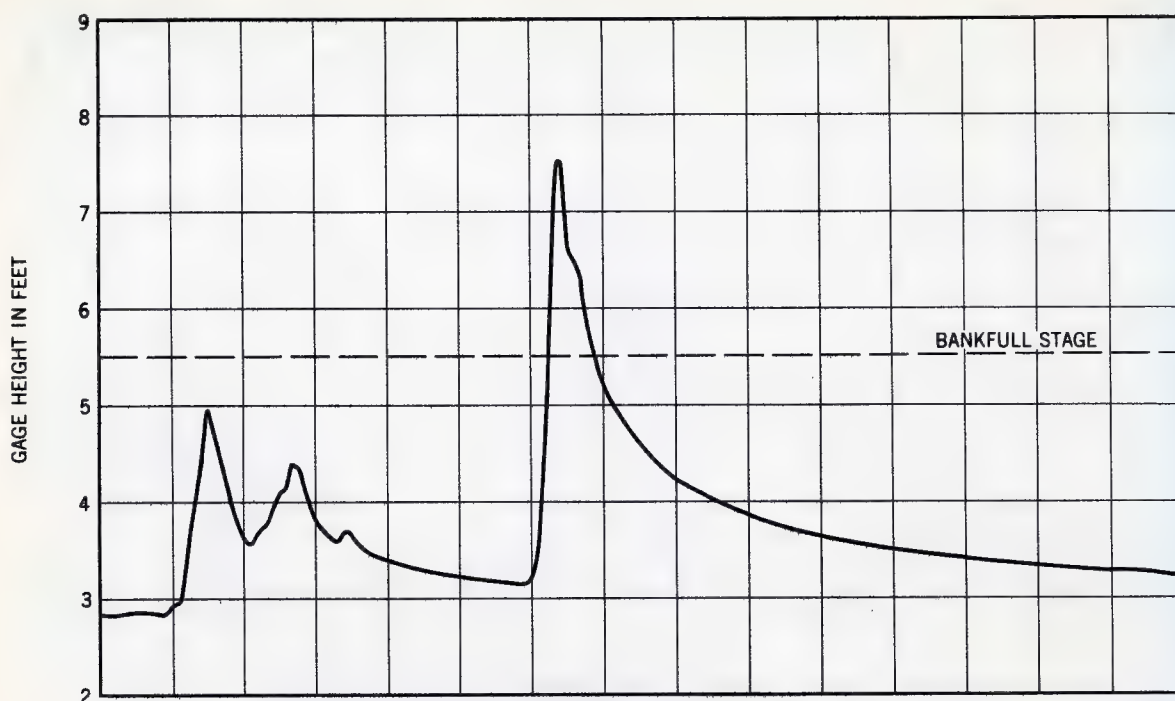
FLOODS OF SEPTEMBER-OCTOBER 1964
TUCKASEGEE RIVER AT BRYSON CITY, N.C.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,714.54



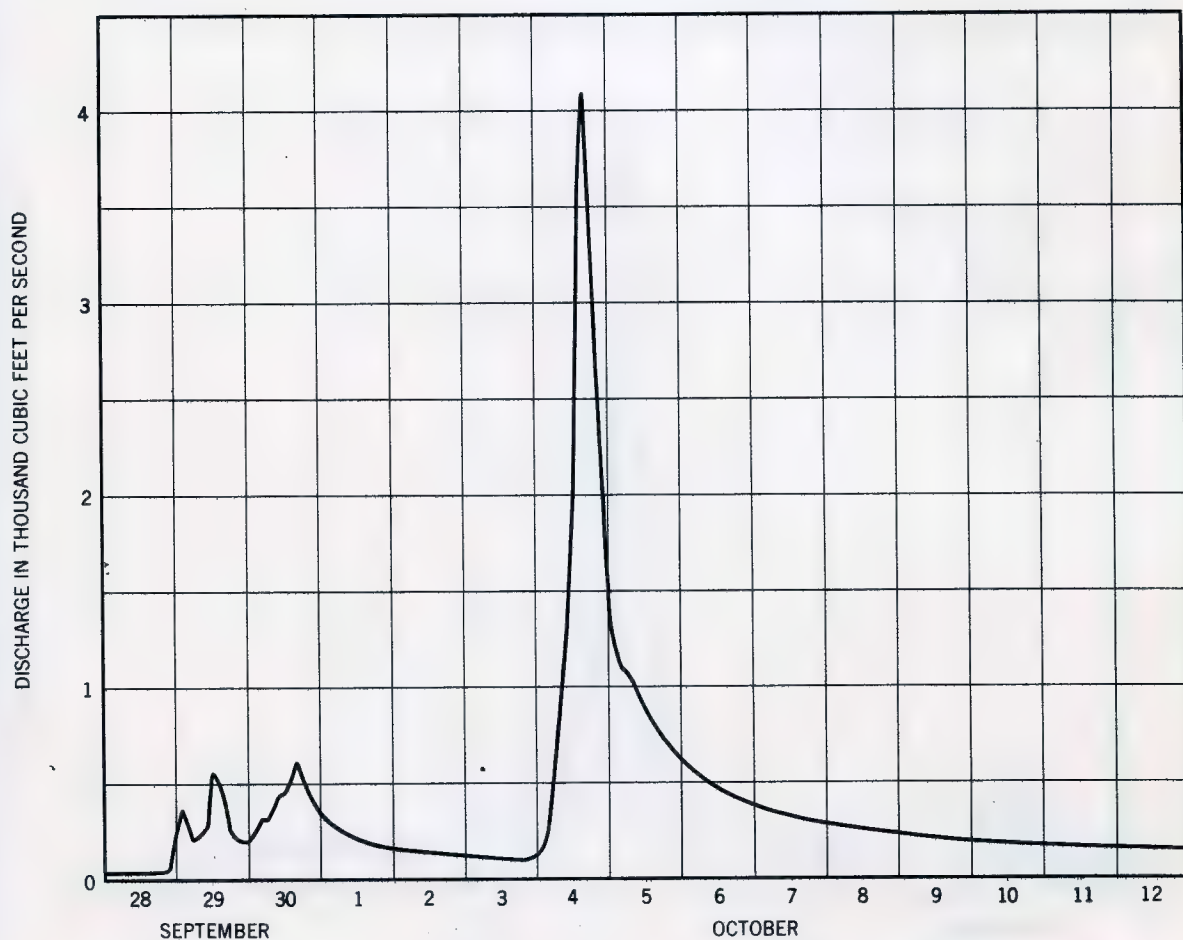
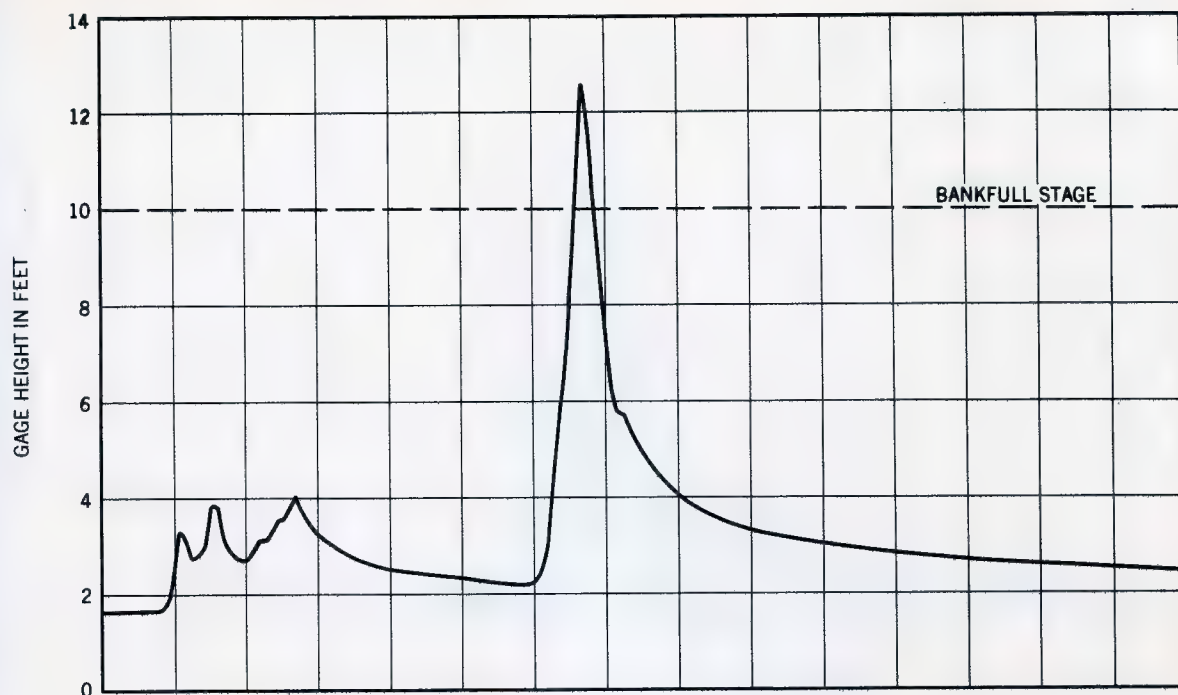
FLOODS OF SEPTEMBER-OCTOBER 1964
NANTAHALA RIVER NEAR RAINBOW SPRINGS, N.C.
STREAM STAGES AND DISCHARGES

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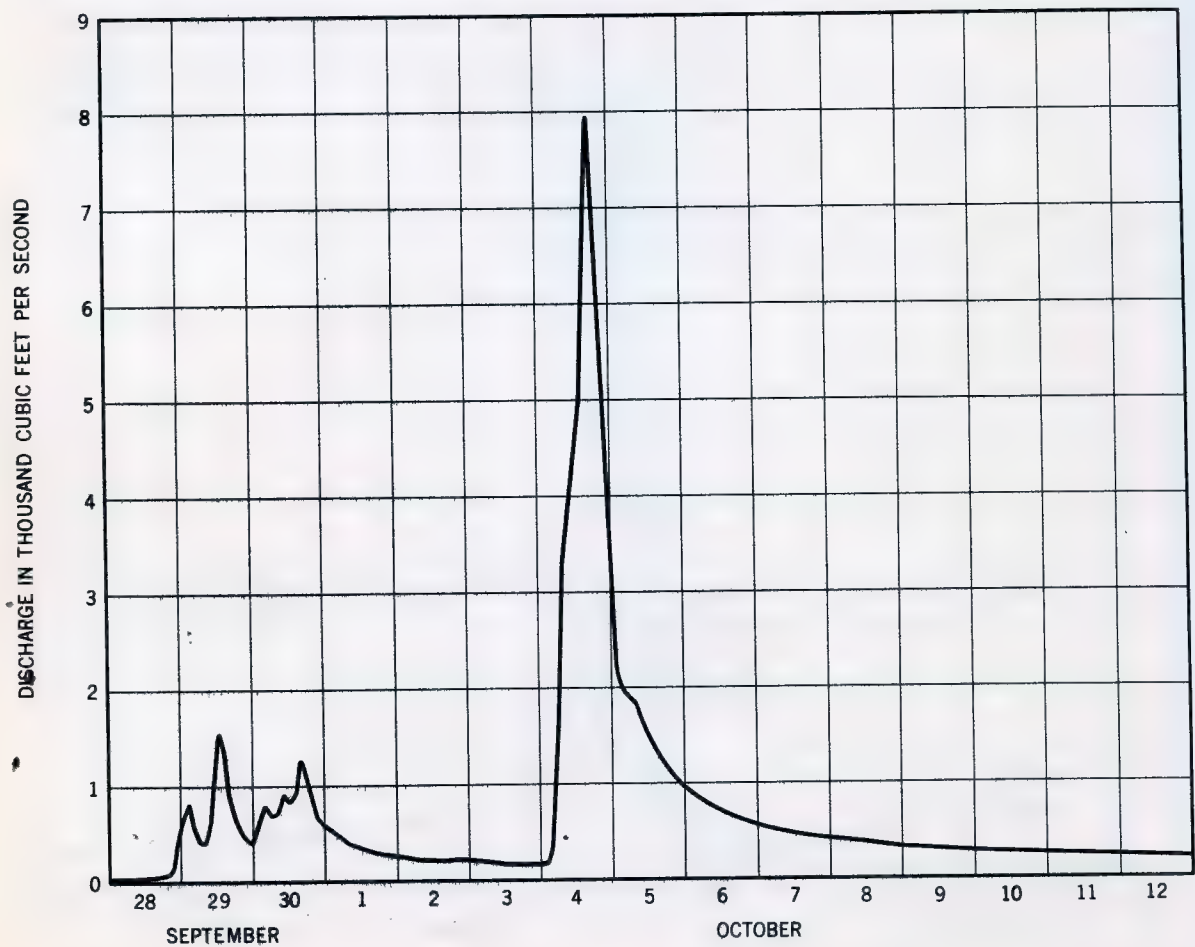
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FLOODS OF SEPTEMBER-OCTOBER 1964
SCOTT CREEK ABOVE SYLVA, N.C.
STREAM STAGES AND DISCHARGES



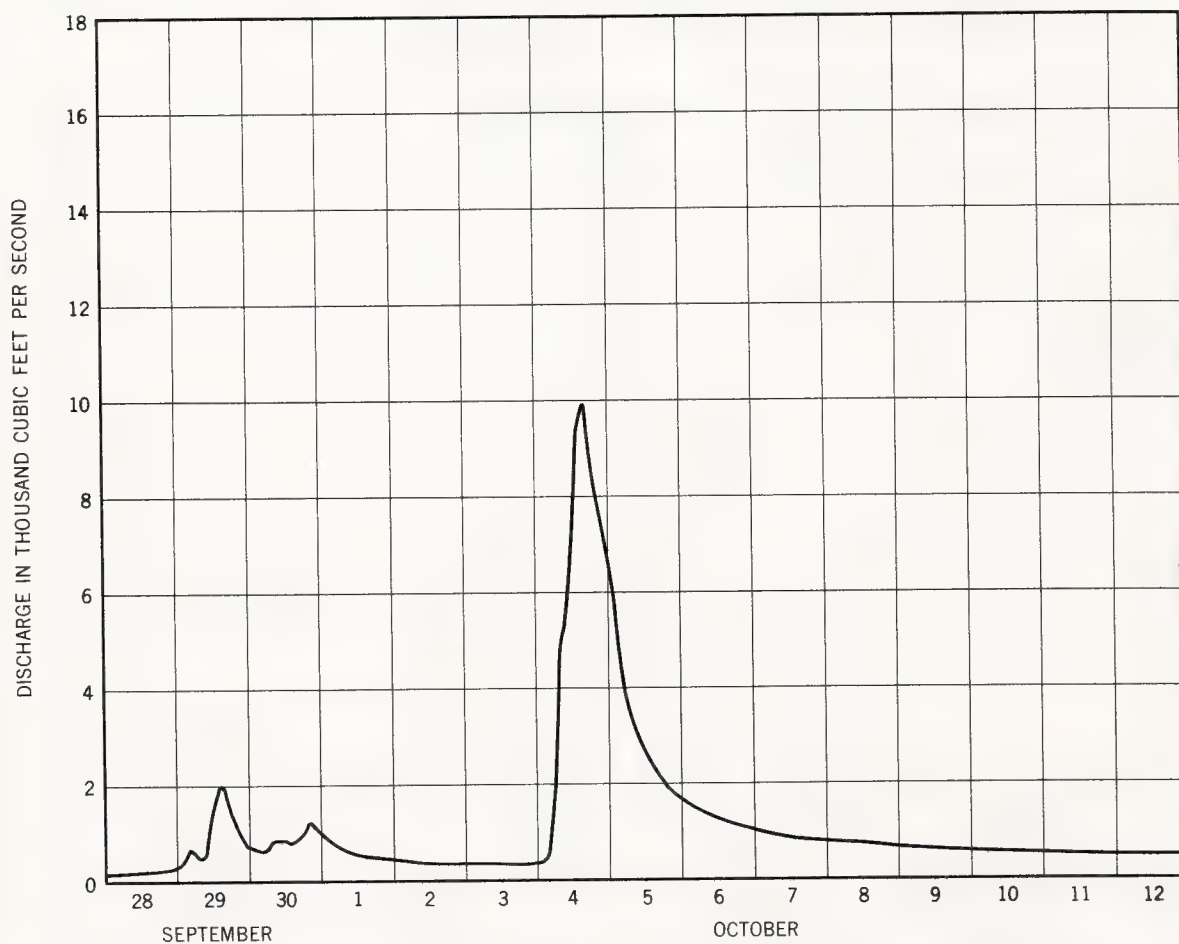
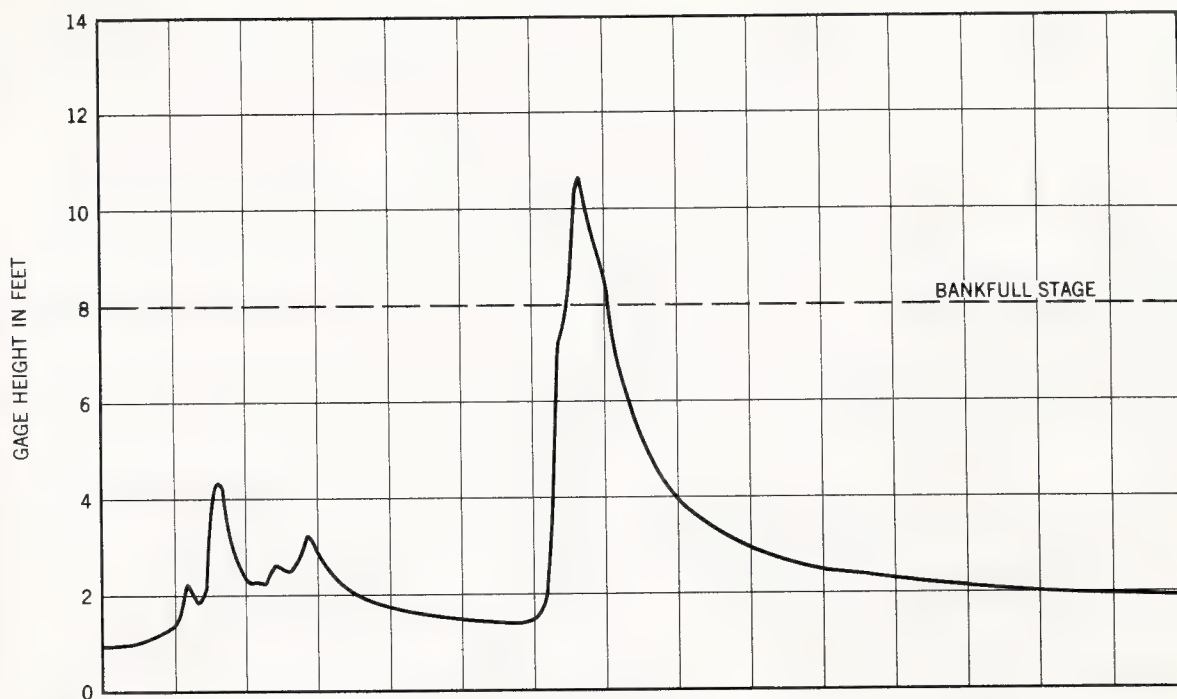
FLOODS OF SEPTEMBER-OCTOBER 1964
HIWASSEE RIVER AT PRESLEY, GA.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,932.69



FLOODS OF SEPTEMBER-OCTOBER 1964
NOTTELY RIVER NEAR BLAIRSVILLE, GA.
STREAM STAGES AND DISCHARGES

GAGE ZERO 1,812.47



GAGE ZERO 1,782.08

FLOODS OF SEPTEMBER-OCTOBER 1964
TOCCOA RIVER NEAR DIAL, GA.
STREAM STAGES AND DISCHARGES



GAGE ZERO 1,445.28

FLOODS OF SEPTEMBER-OCTOBER 1964
 OCOEE RIVER AT COPPERHILL, TENN.
 STREAM STAGES AND DISCHARGES

APPENDIX D

TABULATIONS OF DAMAGES

IN THE UPPER

FRENCH BROAD, LITTLE TENNESSEE, AND HIWASSEE RIVER BASINS

TABLE 17
SUMMARY OF DAMAGES
VICINITY OF ROSMAN, NORTH CAROLINA

Floods of September-October 1964

Industrial

3 Firms affected		\$ 58,000
------------------	--	-----------

Commercial

3 Grocery stores	\$14,000	
1 Drive-in restaurant	200	
1 Recreation center	25	
1 Automatic laundry	100	
2 Vacant store buildings	125	
1 Church	800	
1 Airfield	50	15,300

Residential

4 Apartment buildings	10,200	
22 Residences	13,600	
1 Church parsonage	1,100	
2 Trailers	5,000	29,900

Utility

Electric services	200	
Telephone services	2,800	3,000

Railroad

Trestle damage		1,800
----------------	--	-------

Municipal

Streets and drains	500	
Rescue activities	500	1,000
Total tangible damage		\$109,000
Estimated intangible damage		11,000
Total, all damage		\$120,000

TABLE 18
SUMMARY OF DAMAGES
VICINITY OF BREVARD AND PISGAH FOREST, NORTH CAROLINA
 Floods of September-October 1964

Industrial

Pisgah Forest	
1 Firm affected	\$3,800

Commercial

Brevard		
1 Drive-in theater	\$2,225	
1 Mobile home sales	7,200	
1 Motor court	3,000	
1 Radio shop	250	
1 Bulk oil plant	25	
1 Heating firm	100	
1 Airfield	<u>100</u>	
		22,900

Residential

Brevard		
26 Trailers	37,000	
Pisgah Forest		
10 Residences	\$3,500	
1 Trailer	<u>1,000</u>	
	<u>4,500</u>	41,500

Utility

Brevard		
Electric services		2,000

Municipal

Brevard		
Streets, bridges, sewers		<u>3,100</u>
Total tangible damage		\$73,300
Estimated intangible damage		<u>7,300</u>
Total, all damage		\$80,600

SUMMARY OF DAMAGES

VICINITY OF ASHEVILLE, NORTH CAROLINA

Flood of October 4-6, 1964

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TABLE 21
SUMMARY OF DAMAGES
VICINITY OF MARSHALL, NORTH CAROLINA
 Flood of October 4-6, 1964

Commercial

French Broad River		
3 Oil bulk plants	\$1,300	
1 Department store	100	
Other stores - preventive measures	<u>500</u>	\$1,900

Utility

French Broad River		
Electric service		500

Municipal

French Broad River		
Schools	1,000	
Post office	100	
Streets and drains	<u>200</u>	<u>1,300</u>
Total tangible damage		\$3,700
Estimated intangible damage		<u>400</u>
Total, all damage		\$4,100

TABLE 23
TABULATION OF DAMAGES
TUCKASEGEE RIVER BASIN

Flood of October 4, 1964

Industrial

Firm at Cullowhee	\$ 3,000	
Firm at Whittier	<u>50,000</u>	\$ 53,000

Commercial

Service station, Cullowhee	500	
Cottages, Dillsboro	3,000	
Construction company, Dillsboro	<u>3,000</u>	6,500

Residential

12 Trailers, 2 houses, Cullowhee	16,000	
House, Dillsboro	<u>300</u>	16,300

Agricultural

Tobacco - 0.5 acre	750	
Corn - 5 acres	500	
Barn	<u>50</u>	1,300

Highways

Jackson County - roads		
Replacing fill and gravel surface	4,000	
Road shoulders	<u>1,000</u>	
	5,000	
Jackson County - bridges		
1 - 100' timber bridge, Cullowhee	15,000	
1 - 100' suspension footbridge, Tuckasegee	3,000	
1 - 150' suspension footbridge, Whittier	<u>3,000</u>	
	21,000	26,000

Railroad

Southern Railway - fill and ballast		10,000
-------------------------------------	--	--------

Utility

Nantahala Power & Light Co		1,000
----------------------------	--	-------

Other

Rescue activities		<u>500</u>
Total tangible damage		\$114,600
Estimated intangible damage		<u>11,400</u>
Total, all damage		\$126,000

TABLE 24
TABULATION OF DAMAGES
UPPER HIWASSEE RIVER BASIN
 Flood of October 4, 1964

<u>Industrial</u>			
Brasstown Creek			
Dairy company			\$ 15,000
<u>Commercial</u>			
Nottely River			
Golf course			3,500
<u>Residential</u>			
Brasstown Creek			
1 House washed away	\$ 1,000		
Other damage	<u>2,750</u>		3,750
<u>Agricultural</u>			
Brasstown Creek			
Corn - 47.5 acres	2,850		
Hay - 54 acres	3,000		
Pasture - 72 acres	1,980		
Sorghum cane - 9 acres	2,020		
Tobacco - 2.05 acres	1,100		
Peppers - 8 acres	<u>600</u>		11,550
<u>Rural Property</u>			
Brasstown Creek			
Land scour	\$2,350		
Private roads	300		
Private bridges	500		
Fences - 1.35 mi.	300		
Other	<u>150</u>	3,600	
Nottely River			
Land scour		<u>2,500</u>	6,100
<u>Highways</u>			
Towns County, Georgia (Hiawassee-Brasstown)		18,000	
Union County, Georgia (Nottely River)		20,000	
Clay County, North Carolina			
Replacing fill and gravel surface	7,000		
Retaining walls	1,200		
Fill damage	500		
Bridges	<u>4,000</u>	<u>12,700</u>	<u>50,700</u>
Total tangible damage			\$ 90,600
Estimated intangible damage			<u>9,400</u>
Total, all damage			\$100,000

TABLE 25
TABULATION OF DAMAGES
TOCCOA-OCOEE RIVER BASIN

Flood of October 4, 1964

Commercial

Copperhill			
2 Motor companies	\$	190	
Service station		10	
Grocery		<u>10</u>	
			\$ 210

Residential

Copperhill			
3 Basements flooded		80	
Other cleanup		<u>20</u>	
			100

Agricultural

Hemptown Creek			
Corn - 56 acres		3,040	
Hay - 3 acres		100	
Pasture - 3 acres		100	
Collards - 5 acres		<u>1,500</u>	
			4,740

Rural Property

Toccoa River			
Private bridge		400	
Hemptown Creek			
Scour of stream banks - 500 feet	\$	400	
Land scour		3,500	
Fences - 0.5 mi.		150	
Private bridge		<u>1,000</u>	
		<u>5,050</u>	
			5,450

Highways

Fannin County, Georgia			
Roads and culverts		3,500	
State and county bridges		<u>2,500</u>	
			<u>6,000</u>

Total tangible damage	\$16,500
Estimated intangible damage	<u>1,500</u>
Total, all damage	\$18,000

APPENDIX E

NEWSPAPER ACCOUNTS

OF THE

FLOODS OF SEPTEMBER-OCTOBER 1964

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WEATHER
Occasional rain or showers and
mild. High about 72. Page 11.

THE ASHEVILLE CITIZEN

Dedicated to the Upbuilding of Western North Carolina

GAVIN
GOP gubernatorial candidate to
visit WNC. First page, Sec. 1.

95th Year • No. 274 7c Daily • • • 20c Sunday

Asheville, N. C., Wednesday Morning, September 30, 1964

WWNC Radio 570 C85

46 Pages

Flood--Worst Since 1916--Rips Through Rosman

Soaking rains that have saturated the Rosman area since the first of the week Tuesday caused a flood "worse than the one in 1916" at the headwaters of the French Broad River in Transylvania County.

The flood that tore through Rosman Tuesday chewed away part of a railroad bridge and a highway bridge and undermined the foundations of scores of houses.

The Weather Bureau at the Asheville Airport reported that 12.64 inches of rain fell at Rosman in the 24 hours ending at 5 p. m. Tuesday.

The Red Cross reported that 12 to 14 families had been evacuated Tuesday from their homes in the Rosman area. Highway 178 was closed to traffic.

No injuries were reported. The comparison with the 1916 disaster came from former Mayor Austin Hogsed of Rosman after rescue squads from Brevard and Rosman combed the area in boats and four-wheel drive vehicles looking for stranded residents.

There was concern for some time Tuesday for night-shift workers in Rosman who might have been asleep when the water rose into houses on the lower level of the town.

The headwaters of the French Broad were moving in crest downstream and were expected to produce flood stages at several points along the French Broad Valley, the weatherman said.

The river crested at Rosman at 5 p. m. Tuesday at 13.3 feet. It was expected to crest at between 19 and 20 feet downstream at Blantyre early Wednesday.

Flood stage there is 17 feet but no extensive damage was expected.

The Weather Bureau said the river would crest at Asheville at 6½ to 7½ feet at 3 a. m. with a flood stage of eight feet.

The forecast for Wednesday calls for occasional rain or showers with a high temperature of 72 degrees. Despite the dampness, the mercury hit a high of 73 in Asheville Tuesday.

A total of 2.08 inches of rain was measured at the Asheville Weather Bureau during the 24 hours ending at 7 p. m. Tuesday.

Downriver at Marshall the French Broad was expected to crest at 11 feet at 1:30 a. m. Wednesday with an 11-foot flood stage. Hot Springs was expected to get a crest at 11 to 12 feet at midnight, but the flood stage there is 13 feet.

The Weather Bureau warned that all persons with interests along the river should take necessary precautions. The

river was 6.13 feet at Asheville at 8:10 p. m. and rising.

In Transylvania County the center supports of the Southern Railway trestle were knocked out at Rosman, although the bridge was still standing, and the U.S. 178 bridge was awash and closed to traffic.

While the waters continued to climb, Hogsed said there was word of a cloudburst in the Gloucester community, above Rosman, and the threat of even more water. It was already window-deep to automobiles in some sections, and

rescuers in boats plowed along between houses.

At 8 p. m. Tuesday, Transylvania County Sheriff Carter McCall said there also was high water on U.S. 276 South of Brevard, measured at two feet over the pavement. This was coming, he said, from Little River.

The sheriff said he also had heard that part of an earth dam holding a 15-acre lake on Slick Rock Mountain had "slid off," and that while no water had escaped, residents three miles below the area had been warned to expect trouble.

THE ASHEVILLE CITIZEN, ASHEVILLE, N. C.
Thursday, October 1, 1964

Rosman Floods Recede

ROSMAN, N.C. (AP) — Receding flood waters Wednesday left a six-inch layer of mud in homes, yards and stores of this mountain village of 500 population as Red Cross workers provided food and shelter for flood-out families.

The Weather Bureau said Rosman recorded 16.18 inches of rain between the start of the downpours Monday night and 1 p. m. Wednesday.

The Red Cross established headquarters in the town schoolhouse, where meals and bedding were furnished to about 30 families who were unable to return to their soggy, muddy dwellings.

Those who surveyed the results of the flooding said they were unable to estimate damage.

It was necessary to haul water to the school because wells which normally supply water were flooded and posed a health problem. The town has no water system. Water for drinking, cooking and bathing was hauled from wells on higher ground.

The flooded dwellings also were without light and heat.

A few residents who were forced to flee returned to their homes on a make-shift basis while others were taken in by neighbors whose homes are situated above the high water mark.

One of the victims, Gordon Whitmire, said his home became uninhabitable in less than an hour Tuesday. He said the river under the railroad trestle clogged the span with logs and branches, forming a leaky but effective dam that caused water to pour out to the sides of the bridge and straight into his house.

Whitmire was one householder who did not rely on a well for water, but he was cut off anyway. The supply pipe from a higher elevation was swept away by the flood.

Transylvania County Schools were closed Wednesday because county roads were quagmires that buses could not hope to travel.

A damage item of considerable magnitude was the construction delay caused at the plant site of the American Thread Co., at Calvert, below Rosman.

The low-lying area caught part of the flood and thousands of gallons of water poured into long service tunnels under the rising plant. It will all have to be pumped out, according to plant manager J. D. King, and he predicted a two-week setback in the construction schedule, which is already late.

Nearly nine inches of rain fell Monday and Tuesday in Jackson County, and three schools, Canada, Cashiers, and Glenville, were closed after a power failure caused by high water.

The Nantahala Power and Light Co. reported that the flow into Glenville Lake went from a normal 24 cubic feet per second Monday to 1,875 after the rains came, and then fell off to 700 cubic feet per second Wednesday, indicating that the worst was over.

THE TRANSYLVANIA TIMES

A State And National Prize - Winning A.B.C. Newspaper

Vol. 77—No. 40 SECOND CLASS POSTAGE
PAID AT BREVARD, N. C.
ZIP CODE 28712

BREVARD, N. C., THURSDAY, OCTOBER 1, 1964 ★ 4 PAGES ★ PUBLISHED WEEKLY

Transylvania, Especially Rosman, Hit By Flood, Damages To Run In Thousands

Bridges, Roads Are Washed Out, Schools Closed

Transylvanians, and particularly those persons living in the Rosman area, are reeling from high water and flash floods on Tuesday that sent many from their homes, washed out bridges and railway trestles, foundations of homes, etc.

Damages will run into the thousands of dollars.

Highways, including US 276 from Brevard to Greenville and from Rosman to Pickens, were still closed Wednesday morning.

Because of flooding on secondary roads and washed out bridges, schools in Transylvania were closed Wednesday.

Some 20 families were evacuated at Rosman Tuesday afternoon, and the Rosman Rescue squad was kept busy all during the day and night.

Homes were also evacuated at Pisgah Forest.

The flood at Rosman was described as the "worst since 1916", when the Lake Toxaway dam broke.

In less than 24 hours, Rosman's rainfall was reported at 12.64 inches at 5:00 p.m. Tuesday.

From late Monday until Wednesday morning at 3:00 o'clock some 8 inches fell on the Brevard area.

No injuries were reported; however one man suffered cuts and bruises in a one-car accident near Rosman Tuesday afternoon.

Patrolman Bill Sawyer said he was driving too fast for road conditions.

In addition to the houses being evacuated at Pisgah For-

est, one trailer was raised up out of the high water by the Brevard Rescue squad.

The squad also had another call from a Pisgah Forest resident when a dresser that was being moved fell on a woman.

The Brevard Drive-In theatre, located on the old Hendersonville highway, near Pisgah Forest, was completely flooded by the high water, and damages are expected to run at least two thousand dollars.

All of the bottomlands in the area are flooded, and the water is expected to continue to rise for a few hours after the rains have subsided.

Jimmie Rowe, captain of the Brevard squad, said there was a possibility of people above the Davidson River substation being trapped behind the rapid flowing waters.

Their homes are said to be completely surrounded by the water.

The squad has a large number of boats at the squad building which are ready for action at any emergency.

The American Red Cross has set up an office in the grammar school building at Rosman to give what assistance they can to the people who suffered the loss of clothing, furniture, etc.

Miss Ruth Lockman, field representative from Asheville, and Gene Jarvis, are on the scene, and they make a plea for clothing, household items, furniture and other donations.

Members of the Transylvania chapter of the Red Cross are keeping the office and distributing the items that are being collected.

Many adults have lost all of their clothing, and there is a dire need for clothing for girls, ages 7 to 18, and boys, 9 to 16.

Some 10 homes were severely damaged by the flood waters, and many others were hit by the high waters.

The Waynesville (N.C.) Mountaineer, Thursday, October 1, 1964

County Has No Flooding Despite Rain

Despite an almost steady rain since Monday, Haywood County has been spared the effects of flooding felt by adjoining counties.

With the end of almost three days of steady, but light, rain in sight, most county streams are still within their banks.

Pigeon River slashed at its banks at times Tuesday and Wednesday and tributaries swept out into fields in spots as a result of about 5-1/2 inches of rainfall on the head of Big East Fork and about 5 inches on the West prong of Pigeon River during the past two days.

Virtually all streams, regardless of size, were reported receding early today.

High water is believed to have played a part in the death of a 58-year-old Canton man, J. H. (Hank) Allen, in the Highland Park section early Wednesday.

According to officers who went to the scene, Allen appeared to have accidentally fallen face down into the water.

A report from the county farm agent's office this morning indicated that Haywood farmers will sustain only minor damage from the rainfall.

Tobacco that had been cut before the rain started and that was still on the ground has been damaged somewhat by sand and mud. However, "there's not a lot of this," Assistant County Agent Clayton Davis said.

The apple crop has not been hurt since the varieties which would have been effected have already been harvested. About the only effect in the orchards has been to slow down picking.

The tomato crop has almost all been harvested for the year, and damage in that area is viewed as "slight."

THE ASHEVILLE CITIZEN, ASHEVILLE, N. C.
Friday, October 2, 1964

French Broad Runs Shy Of Flood Stage

The rain-swollen French Broad river was running at 7.5 feet at 7 p. m. Thursday, only one-half a foot shy of flood stage, according to the Weather Bureau.

However, no flooding is ex-

pected unless heavy rain develops Friday.

For Friday the prediction calls for mostly cloudy skies, mild temperatures and showers falling over 80 per cent of the mountain area. The high temperature for the day is expected to be about 70 degrees, weather officials said.

Thursday's high temperature was 66, only seven points above the low for the day. Relative humidity was measured at 90 per cent at 7 a. m. and again at 1 p. m.

The Highlander



The ONLY Newspaper in This Wide World Devoted Exclusively to Promoting Highlands Area
Published in the Highest Elevated and Most Hospitable Town in Eastern America

Vol. 7

Highlands, N. C. Friday, October 2, 1964

Number 40

Eight Inches Of Rain In 15 Hours Sees Worst Overflow In 14 Years

Precipitation Reaches Over 12 Inches
From Monday P. M. To Wednesday A. M.

Torrential rain that kept up an almost unwavering intensity through Monday night and Tuesday morning dumped eight inches of water in the Highlands area within a 15-hour period and continued at a fairly steady tempo throughout the day Tuesday.

Streets were flooded, and small creeks were turned into turbulent rivers of water that overflowed their banks and swept over the top of many bridges.

Jimbo Potts and family were forced to abandon their home when they awoke in the middle of the night to find some 18 inches of water flooding the bedroom floor. Other homes also reported water seepage. Considerable road damage was done, especially on secondary roads, and a small lake near the home of Mrs. Grover Edwards went out.

The prolonged downpour of rain came near the end of a month that had been unusually dry, as only about one-half inch of rain had fallen in September prior to this rainy period, which began with drizzles during the week end.

Reminiscing Highlanders declare the rainstorm to be the worst since August, 1940, when roads were washed away, landslides occurred and bridges were swept away by high water.

The month of September as a whole has been one of warm sunshine and deep blue skies that was much en-

THE WEATHER

	High	Low	Rain
Sept. 23	74	58	.07
Sept. 24	67	50	tr.
Sept. 25	66	42	.00
Sept. 26	64	38	.00
Sept. 27	61	50	.22
Sept. 28	65	59	.67
Sept. 29	65	58	11.75

joyed by part-time residents who remain through the fall, and by the local people as well.

Although temperatures dropped several times to "frosty" degrees, and reports of light frosts around the community were made, no killing frost had occurred previous to the rain, and summer flowers still bloomed in profusion.

Predictions by "old timer" weather prophets were that temperatures would likely drop and perhaps freezing weather take over for a few days when the rain finally ends.

Dr. Thelma Howell reported Wednesday morning that a total of 11.75 inches of rain fell from 6 p.m. Monday to 6 p.m. Tuesday, and that an estimated 1½ inch had fallen from 6 p.m. Tuesday until around 9 a.m. Wednesday.

Intermittent rain was still falling Wednesday afternoon.

The Asheville (N. C.) Times, Friday, Oct. 2, 1964

Some Rain Still Likely In WNC Area

The French Broad River continued to settle back into its banks today after a spree brought on by too much rain-water earlier this week.

The water crested here at 7.54 feet, just under the eight-foot flood stage, between 11 p. m. yesterday and 1 a.m. today. At 8:30 a.m. today it stood at 7.20 feet and was falling slowly.

The weather outlook through Monday called for "some rain most days." Showers should fall over about 75 per cent of the Asheville area tomorrow, the Weather Bureau said this morning.

Hurricane Hilda, now churning up the Gulf of Mexico toward Louisiana, still presented a big question mark on weather conditions here.

Forecasters said they were keeping their fingers crossed as

far as Hilda is concerned, and weren't making any attempt at predicting what the big storm would do here toward creating more heavy rains.

Some light rain or drizzle at times was predicted for today and tonight. Temperatures should remain moderately cool through Monday, the bureau said.

At Rosman, where the headwaters of the French Broad Tuesday poured four feet of water into part of the town of 500, families forced from their homes were returning to clean up the debris and scrape away about four inches of mud.

Some 20 families had to abandon their homes at the height of the flood.

Wells flooded by the river were expected to be decontaminated by today, according to Walter Hart, Transylvania County sanitarian.

Electric service was restored yesterday and secondary roads were reopened. Both the high school and elementary school were back in operation.

Asheville, N. C., Monday Morning, October 5, 1964

Floods Rip Mountain Area; Two Killed

More Damage Foreseen Along French Broad

Two deaths were counted Sunday as waterlogged Western North Carolina was hit by new floods and braced for further damage along the swollen French Broad River.

One fatal accident took place in Henderson County where a motorist apparently attempted to drive across the Clear Creek Road bridge. However waters which had already submerged the bridge swept car and driver into Clear Creek before he reached the bridge.

The body of a man identified as William Lewis Cantrell, 51, of Hendersonville, was recovered by the Henderson County Rescue Squad after a cable was hooked to the car.

The other fatal accident took place just across the South Carolina line near Rosman. The Pickens County, S. C., sheriff's department reported that Jarrett Keith lost his life in a landslide that buried him and Ansell Britton as the two were chopping a tree to clear it from U.S. 178.

Deputy Sheriff Melvin Gillespie said Britton was buried up to his neck but managed to kick free.

Meanwhile, cresting mountain rivers and streams kept cutting off major highways, then receding to allow traffic to pass.

For a time, Hendersonville was isolated. The Biltmore business district was flooded for a time as Sweeten Creek rose to the front doors of some offices.

Two earthen dams broke in Macon County, probably the hardest hit, as the Little Tennessee and Cullasaja joined to flood low-lying areas to an average of four feet. Some 30 to 40 homes were evacuated along the rivers.

Meanwhile, in Asheville and further north at Marshall, watchers waited for expected flood crests to hit.

The French Broad which had crested at 14.95 feet in Rosman at 1:45 a. m. (flood stage is eight feet) was due to crest at Asheville about 2 a. m. at from 12 to 14 feet (flood stage eight feet).

The crest was due at Marshall at midnight and the U. S. Weather Bureau at the Asheville Airport predicted a crest of 18 to 19 feet (flood stage 10 feet).

Meteorologist-in-charge Earnest L. Rodney of the Asheville Weather Bureau offered some hope for respite from rains which had dumped 5.42 inches of rain on Asheville in the past 24 hours and 13.74 inches on Rosman, already hit by one flood last Tuesday.

"The leading edge of some cooler air passed through Western North Carolina early this (Sunday) afternoon," he said. "Some of this cool air also extended further south and assisted in weakening the remnants of tropical storm Hilda. The addition of this cooler air will accelerate the storm eastward and decrease chances of our receiving any additional heavy rain."

Rodney said the effects of the dryer, cooler air will cause most of the rain to end Monday morning with a clearing trend developing Monday night.

The Weather Bureau reported the heavy rains—not hurricane related—beginning near 1 a.m. Sunday produced from four to 14 inches of precipitation over WNC up to 7 p.m.

Other crests noted by the Weather Bureau were the Swannanoa, cresting at 11.12 feet at 6:20 p.m. in Biltmore (flood stage 12 feet) and the French Broad due to crest at 6 a.m. in Blantyre (Transylvania County) at 20-22 feet (flood stage 17 feet).

Other heavy rainfalls Sunday included 5.75 inches at Brevard (the Brevard Rescue Squad brought a group of girl Scouts out of a camp in Transylvania County and brought them to Asheville); Pisgah Forest, 7.53 inches; Canton, 3.37 inches, and, Swannanoa, 3.94 inches.

The State Highway Patrol reported the following roads closed at 9 p.m. Sunday: N.C. 178 and 276-South in Transylvania; U.S. 25 South and 176 South in Henderson; N.C. 9 in Polk and part of Rutherford; U.S. 19A along a portion of the Tuckasegee River in Jackson plus the southern portion of U.S. 441; all roads around Cullowhee; N.C. 191 in Buncombe and Transylvania; N.C. 23 and 28 in Macon and 107 in Jackson.

U.S. 25-70, the Marshall High-

way, was still open at 9 p.m., although expected to be closed later in the evening. It had been reported awash earlier in the day.

For a time Sunday afternoon, such major arteries as U.S. 74 into Chimney Rock and 25A and 25 into Henderson County were cut off.

The rising waters in Biltmore caused the Red Cross to open an emergency aid shelter Sunday afternoon in Lee Edwards High School. Businesses along the Riverside Drive truck route paralleling the French Broad were hastily evacuated during the afternoon in the face of the crest threat.

Heavy traffic plagued evacuation efforts from Biltmore to Macon County, some of it caused by sight-seers flocking to spots where trouble was expected.

A dollars-and-cents estimate of flood damage was impossible. Guesses are that it would be high. There were plenty of flooded basements in Asheville, but the waters seem to recede as fast as they rose.

Asheville industrial plants sent out various calls for help during the day, the Hicks Corp. for employees to help sandbag the plant, for Three Mountaineers employees to move lumber to safer storage and from some plants to tell shifts to stay home.

At least two Asheville radio stations, WWNC and WSKY, planned to remain on the air throughout the night to keep listeners abreast of flood developments.

Utility troubles in Asheville weren't too pressing. Power was out in the Biltmore area for some 20 to 30 minutes Sunday morning when the Victoria Road feeder developed trouble, Carolina Power & Light Co. reported. And Southern Bell said the excessive rainfall apparently knocked out a line supplying some 125 Beverly Hills area subscribers.

Again on the road front, the Highway Patrol blocked off the Alexander bridge into the French Broad community as the structure began sagging dangerously.

In the Buckeye Cove section, the entire front wall caved in at the home of Fred Bartlett Jr. after the heavy rains had weakened the dirt and cement

structures. Bartlett, his wife and two children were forced to move to his father's home.

An American Enka Corp. spokesman said that Hominy Creek stood two feet above flood stage late Sunday afternoon but that production schedules weren't interrupted.

The work of pumping water out of the plant continued throughout Sunday with Enka Volunteer Fire Dept. members and other emergency crews standing by, if needed.

Telephone Service Maintained

Long distance telephone service to Brevard was knocked out Sunday night. But with that one exception all towns in Western North Carolina were in contact with Asheville by telephone, a Southern Bell spokesman said.

George Tisdale of Asheville said phone traffic was extremely heavy but virtually all calls were getting through.

In Hendersonville the National Guard used amphibious vehicles to carry operators to and from work. No telephones were reported out of order, thought it was likely that many were out and unreported.

In Asheville about 150 telephones in the Beverly Hills area were knocked out when an underground cable at the golf course became waterlogged. A crew was sent out to work until full service was restored.

Another crew was dispatched to Woodfin Trailer Park. There, they disconnected lines from all trailers so they could be moved to higher ground.

At the Hicks Corp. plant in Woodfin, a third crew moved all switchboard and other phone equipment about four feet above floor level. Hicks officials earlier had ordered flood precautions to be taken and sandbags had been placed at strategic points.

County-By-County Roundup On Flood Conditions

ASHEVILLE CITIZEN, ASHEVILLE,
Monday, October 5, 1964

A summary of flood conditions, in a county-by-county listing, was compiled Sunday by The Citizen. It follows:

BUNCOMBE — The French Broad and Swannanoa rivers were out of their banks at several points. The Swannanoa covered sections of N. C. 81 between Biltmore and the Koon Development. The French Broad was out near the Henderson County line and in the River-side Drive-Amboy section of Asheville. The steel bridge across the French Broad at Alexander was closed after its supports were weakened. Sweeten Creek flooded part of Biltmore for a time rising two or three feet in front of the ABC Store. Trucking firms pulled tractor-trailer rigs from terminal areas along both rivers and warehouses were braced against rising waters with sandbags. Streets near the high water points were clogged with sightseers.

CHEROKEE — Steady rain all night Saturday and all day Sunday created no problem. TVA had lowered the level of Hiwassee Lake to a point at which it could accommodate any amount of water the Hiwassee and Valley rivers can carry for some time. The Murphy Police Dept. said no serious trouble from flooding was expected.

CLAY — Steady rain put several creeks out of their banks, but little flood damage was reported. Schools were closed because of high water on school bus routes.

GRAHAM COUNTY — No flood damage was reported despite heavy rains.

HAYWOOD — The Pigeon River hit flood stage at Canton about 5 p. m. Sunday. Only minor flooding was reported, however. The Pigeon also went out of its banks at Clyde. All creeks and streams in the county were high, with many out of their banks.

HENDERSON — Two feet of water covered U. S. 25-176 at their junction near the south city limits of Hendersonville, causing heavy damage to stores, restaurants and other business establishments. The rising water knocked radio station WHKP off the air Sunday morning and did considerable damage to equipment. Hendersonville was swamped with seven inches of rain during a 24-hour period covering parts of Saturday and Sunday. Many county roads

were ruled impassable because of weakened bridges and U. S. 64 was under water both east and west of town. U. S. 25 north was under water in the Druid Hills section.

JACKSON — County Commissioners declared Jackson County an emergency area and the county Civil Defense unit took over. Fifty or 60 families were evacuated from several sections of the county, including 15 from a trailer park near Western Carolina College at Cullowhee. The highway between Sylva and Cullowhee was under water in three places and students were unable to get back to the college after a weekend at home. At Dillsboro several dwellings were in water and the office of a construction company was washed away. Two cows were reported swept away by rampaging Scotts Creek.

MACON — Franklin probably was the hardest-hit town in Western North Carolina. The Little Tennessee and Cullasaja rivers joined to put an average of four feet of water over the low-lying places, particularly at Otto and Indian Mound. In Franklin a 400-gallon gasoline storage tank was washed against the bridge on U. S. 23 and a 1,000-gallon tank was undermined. Danger of fumes were reported high. About 35 families were evacuated along the rivers and rescue squads from Graham, Haywood and Jackson counties helped the Macon unit. The main water line was washed out at Highlands. At Highlands 10.5 inches of rain was recorded between 7 a. m. and 6 p. m. Sunday.

MADISON — Marshall began bracing for high water early

Sunday afternoon. An 18-foot crest was predicted by Sheriff E. Y. Ponder, who said this would put water in the basement of the high school on Blanasett Island in the French Broad. The football field, also on the island, was awash. But the wooden bleachers were chained down and were floating in place. The sheriff expected about 18 inches of water in the jail on Main Street and merchants spent most of Sunday moving merchandise off low shelves in their stores.

SWAIN — The Oconoluftee River was still rising Sunday night but was expected to stay below flood stage. Heavy rains Saturday night and Sunday contributed to a power failure which affected part of Bryson City Sunday. The Bryson City and

Stecoah rescue squads stood by for possible emergencies. Swain schools will be closed Monday because of flooded county roads. Also, the swinging bridge over the Tuckasegee River at Whittier has washed away, cutting students off from school bus approach.

TRANSYLVANIA — Hardest-hit section of the county was Rosman, just recovering from a flood five days earlier. The water was reported about two feet deeper than in the earlier flood. Several buildings were washed down the French Broad and a number of people were evacuated from their homes and fed by the rescue squad. A rock slide across U. S. 64 west of Rosman blocked part of the river and diverted water into the Mitchell-Bissell plant.

2 WNC Plants Cut Off

Two large Western North Carolina manufacturing plants were cut off and perhaps damaged by Sunday's flood waters.

The huge Von Canon Furniture plant at Whittier was surrounded by overflow waters from the Tuckasegee River, which runs past it. The Jackson County Sheriff's department said there was no information as to whether water actually was in the new plant, and telephone contact could not be made with officials Sunday night.

Near Rosman, the Mitchell-Bissell Co., factory was flooded when a big slide collapsed across U. S. 64 and into the French Broad River, partly

blocking the swollen stream and diverting water toward the plant site.

No estimate of damage there was known either. Telephone lines to Transylvania County were out of service.

Pulled To Safety

WAYNESVILLE — C. D. Ketner's car ran off U. S. 19-23 into flooding Raccoon Cove Creek Sunday afternoon. The car was swept 200 feet downstream but Ketner was pulled to safety although only a few inches of the car was visible above the water. He was treated and released from Haywood County Hospital.

WNC Flood Highlights

KILLED — Two deaths were linked directly to heavy rains in the WNC area. One man was killed when his car was swept into Clear Creek in Henderson County. Another died in a landslide just across the South Carolina line from Rosman.

ACCIDENTS — Rain-slick highways were blamed for a rash of wrecks in several western counties. The total number of minor mishaps

was not immediately available.

DAMAGE — Total property damage is sure to mount into the hundreds of thousands of dollars. At least three major industries had flood problems.

EVACUATED — More than 100 families, about 60 from Jackson County alone, were forced from their homes by rising water. Other counties where several families were evacuated

included Macon, Transylvania and Henderson.

HIGHWAYS — The following roads were reported closed at 9 p. m. by the State Highway Patrol: U.S. 178 and U.S. 276 in Transylvania; U. S. 25 and U. S. 176 in Henderson; N. C. 9 in Polk and part of Rutherford; U.S. 19-A, U.S. 441 and all roads around Cullowhee in Jackson; N. C. 191 in Buncombe and Transylvania; U. S. 23 and N.C. 28 in Macon.

The Waynesville (N.C.) Mountaineer, Monday, October 5, 1964

Flood Waters Cause Light Local Damage

Raging flood waters which assaulted many areas of Western North Carolina with relentless force over the weekend seemed to have a certain amount of respect for Haywood County.

Only minor property damage was reported in Haywood while to the west, in the Franklin and Cullowhee area, damages will run into the thousands of dollars.

The Waynesville area recorded more than 4-1/4 inches of rainfall from Saturday afternoon to 7:30 a. m. today.

Streams and tributaries in Haywood County and others throughout WNC were reported dropping rapidly at noon today, and the weather forecast called for much cooler weather by night-fall.

East and South of Haywood, including Buncombe, Henderson and Transylvania counties, property damage will reach a mammoth figure.

A sewer line on Browning Branch Road was hurriedly repaired by town crews before property damage resulted, and a 2-foot manhole on Killian Street spouted murky water two feet into the air as a result of the pressure of the flood waters. Alderman James Parton reported.

High water forced the closing of US 276 between Waynesville and Brevard Sunday, and water at Lake Junaluska was exceptionally high with no damages reported.

Members of the Haywood County Rescue Squad were summoned into the Franklin area at 10:30 a. m. Sunday as a result of the bursting of two dams in that section. Flood waters inundated a major section of Franklin's business district.

Clyde firemen Sunday night assisted with the evacuation of several residents from the Thompson cabins, located along Pigeon River, as flood waters lashed at foundations.

Basements in some areas of Haywood were flooded to minor extent, but no major property damage was reported.

Pigeon River reached flood stage (12 feet) in the Fibreville area Sunday at 5 p. m., according to Canton's Police Chief W. N. Stroup, but started dropping an hour later before the river went out of its banks.

A Buick was swept into Racoon Creek early Sunday morning, as the wheels slipped on the shoulder of the rain-soaked highway between here and Lake Junaluska.

The water swept the car and its driver, C. D. Ketner, down stream where the vehicle lodged against a fence across the stream. Homer Noland, who was following Ketner down the highway, helped him from the car. Ketner was not hurt.

Ketner had gone to check on a warehouse where he had produce stored and was returning to Waynesville when the vehicle slipped into the creek. Wrecking crews pulled it from the creek later in the day as water subsided.

THE ASHEVILLE CITIZEN, ASHEVILLE, N. C.

Monday, October 5, 1964

Franklin Couple's Home Swept Away By Water

By BEV BALLARD
Citizen Staff Writer

FRANKLIN—How does it feel to have your home picked up and moved from under you?

Mr. and Mrs. Wallace Stewart, formerly of Glen's Falls, N. Y., moved to Cullasaja and built a home a little more than a year ago. Early Sunday morning, neighbors woke up the Stewarts and told them rising water from the Cullasaja River had lifted their house and turned it around.

It was not a new adventure for the Stewarts to have to leave their home. Last Tuesday, when water got within six inches of the front door, they moved all their furniture out.

The water failed to get into the house that time, and the couple moved back in Wednesday. On Saturday they put the finishing touches to a paint job in the bedrooms.

But, the dams broke Sunday and the flood came, and the Stewarts were forced to evacuate at 9 a.m. Sunday.

"It's hard to say how I feel right now," Stewart recounted. "It's an awful feeling and I suppose I haven't felt the full impact as yet. I do know that this is a worse experience for my wife."

Mrs. Stewart admitted she was terribly upset, adding "they had to pick me up and carry me out this morning. The water was up to my husband's chest as he walked off the porch. He is six feet tall."

The Stewart home was later swept from its foundation, carried 1,000 feet downstream and

lodged against Cullasaja Bridge. Neighbors helped to save most of the furniture.

They were among a dozen families evacuated from homes in the Cullasaja area. Mrs. Harry Beale, mother of six, spoke by phone from the Cullasaja schoolhouse where two families were marooned and forced to remain overnight.

The Beales were taken to the school when rising water drove them from their home Sunday at 11 a.m.

"Makes a person feel mighty bad not to know if there'll be a house to go home to when this is all over," Mrs. Beale declared.

The home occupied by the Beales is located about one mile from the Cullasaja school. Mrs. Beale is a carpenter employed in Highlands.

"We saw the river rising up close to the house early Sunday and began preparing to leave," Mrs. Beale said.

Also at the schoolhouse was the family of Freeman Watts. Others forced to evacuate in the area were staying at homes of friends and relatives.

Floods Run In Cycles

Western North Carolina's worst floods seem to run in 12-year cycles.

The granddaddy of them all, of course, was the one in 1916. There were major floods too in 1928, 1940 and —after 1952 was spared — 1964.

The Times-News, Hendersonville, N. C., Monday, Oct. 5, 1964

Comparison Of Floods Of '16 And '64 Given

How did the flood of Sunday compare with the flood of July 1916, which is generally considered the worst ever experienced in Henderson County?

The first general conclusion of people who were here during the 1916 flood is that the depth of flood water yesterday afternoon was the greatest since 1916. Some believe the water

was higher in some areas than in 1916.

Damage in dollars in 1916 will not compare with that of the current flood since Hendersonville was much smaller and the business areas now subject to flooding had not been built in 1916.

One other fact made the water level of the 1916 flood

higher. Dams impounding Kanuga and Osceola lakes washed out at about the same time in 1916, sending a wall of water down the Mud Creek plain.

Road damage in 1916 was great because most of the roads were unpaved and subject to washouts. There were, however, fewer bridges in 1916.

Flooding and damage in the 1916 flood covered a much larger area in the opinion of those who witnessed that catastrophe.

The 1916 flood came in the middle of a period of 16 days of recorded rainfall, according to the records. After the ground was thoroughly saturated, rainfall of 9.92 inches was recorded

in one 24-hour period and the total for the 16-day period was 20.16 inches.

Although the 1916 flood is generally remembered as the county's worst, there was also a very damaging flood in 1910, according to the oldtimers. This flood is usually forgotten because of the 1916 disaster.

The last flood occurred in 1961, causing serious damage, but the water level was much lower than that of Sunday. Other serious floods have occurred in 1928, 1940 and 1959.

The 1928 flood washed out bridges which had just been built over U.S. 64 East at Mud Creek.

The Times-News

Hendersonville Times Established in 1881

Hendersonville News Established in 1894

The Times-News, Established in 1927

MONDAY AFTERNOON, OCTOBER 5, 1964

Flood Waters Inundate County

Man Drowns When Auto Goes Into Deep Water

More than nine inches of rain in a period of approximately 30 hours to mid-afternoon Sunday brought Henderson County its most disastrous flood since that of July 1916 and high water was responsible for one death in the county and damage to private and public property that could reach or exceed half a million dollars.

Flood waters were receding today and the assessment of damage was being made by businesses and the State Highway Department.

The death in the county occurred about 4 p.m. Sunday, or earlier, when flood waters swept an automobile occupied by William Lewis Cantrell, 51, of RFD 6 from Clear Creek Road south of the bridge over Clear Creek.

At the height of the flood, Hendersonville was almost completely isolated as water covered all main highways and business establishments in the flood plain area were inundated.

The water covered the bridge rails on U.S. 64 just east of the city limit and the highway was closed. U.S. 25 South and U.S. 176 South were flooded and closed by early afternoon. Flood water covered U.S. 25 North at Druid Hills and at Naples. Virtually all secondary roads in the plains of French Broad and Mills River and Mud Creek and tributaries were flooded and closed to traffic.

During the afternoon, traffic from the South was detoured by way of Little River Road to Kanuga Road and thence into Hendersonville. For a time, eastbound traffic moved by way of Balfour Road and Duncan Hill Road to U.S. 64.

Businesses Flooded

Between 30 and 40 businesses in the Mud Creek area were flooded by noon. On the south a branch of Northwestern Bank, stores, furniture warehouses, eating places, filling stations and other business were flooded to varying depths. Water was in a bowling alley on the south but management said today it did not reach the level of the alleys or damage electrical equipment.

Radio Station WHKP was flooded to a depth of several feet and was forced to discontinue broadcasting at 8:30 a.m. The building was evacuated at 6:30 p.m. and clean-up operations started this morning. Water was three and half feet deep in the transmitter.

President Kermit Edney said the station hoped to be back on

the air by early tonight.

Radio WHVL, a new station scheduled to go on the air October 15, began broadcasting at 11:10 a.m. under emergency authority of the FCC. The station left the air at 9 a.m. today. The station broadcast flood information and cooperated with relief agencies.

Minor Damage

Utilities serving the area suffered only minor damage and disruption of service.

Duke Power Co. early in the day divided service crews with groups on both sides of Mud Creek and a spokesman described difficulties as minor.

Early Sunday morning a squirrel, lodged between wires at Blythe Street and U.S. 64 West, tripped a breaker and disrupted service in a small area west of Hendersonville for about two hours.

Southern Bell Telephone Co. reported only minor disruption of service. About 100 individual circuits were out this morning but service was expected to be restored by tonight.

Manager W. F. Stokes of the Water Department reported "minimum" difficulties. There were few cases of sewer overloading but no major undermining of lines up to this morning and nothing to create contamination of water supplies.

Stokes said the new waste treatment plant was designed to "valve off" excessive waste without drowning out the station. The excess would go directly into Mud Creek where larger volumes of water would dilute it.

Etowah Area

A report this morning from Etowah said at least three fam-

ilies in the Pleasant Grove area were isolated by flood water. There are nine members in one family and another had only recently completed and moved into a new home.

In addition to the recovery of Cantrell, members of the Rescue Squad removed some 15 persons from automobiles stranded in high water yesterday. Several other vehicles were abandoned by occupants and many of these were soon covered by water.

City and County schools were closed today and no plans had been made for re-opening tomorrow.

Amount Unknown

The exact amount of rainfall was unknown. The rain gauge, kept at WHKP, was last seen floating at the rear of the station. Residents keeping private gauges reported nine inches or more of rain, of which some seven inches was from about 9 p.m. Saturday to noon Sunday.

At the height of the rain storm the City Fire Department was pumping water from the city hall basement and hundreds of homes reported flooded basements.

City, county, state and semi-private agencies worked in flood relief capacities. The Hendersonville Rescue Squad had some 30 men on duty all day and last night. All policemen, firemen, deputies and State Patrolmen and some members of the National Guard Company were on duty.

Food Provided

The Red Cross Chapter provided food for workers and made plans for caring for any families forced from their homes. Mrs. Alyce Reese of the Chapter said nine servicemen on leave here were stranded and her office notified Fort Bragg and Fort Jackson that they would be unable to return.

All bus service in and out of the city was halted during Sunday but all schedules were running today with slight delays.

Flood waters were down in the Hendersonville area this morning but were reported as higher in the Etowah area. The flood crest in French Broad River was predicted for 2 a.m. today, unless there is more heavy rainfall in the upper valley.

Highways Reopen

Major highways in the County were open today, although water still covered U.S. 64 East and U.S. 25 North at Naples. Traffic was passing

these areas with caution.

The County maintenance office of the State Highway Department advised that no secondary roads or highways be used except in serious emergency. There are slides and wash-outs on many of these roads and all bridges were considered dangerous.

U.S. Highway 64 West was still closed by high water in the Pisgah Forest and Horse Shoe areas.

Many through travelers were stranded in the area and hotels and motels were filled.

Sanitarian Of County Urges Precautions

Sanitarian Stephen M. Hunter of the Henderson County Health Department urged today that precautionary measures be taken with water supplies because of the flood conditions.

Many wells, springs and reservoirs were subjected to pollution by surface water and water from these sources may not be safe without treatment.

Wells should be pumped as nearly dry as possible and then treated with a chlorine solution of at least 100 parts per million. After treatment, the well should not be used for several hours.

Springs and reservoirs should be drained and scrubbed and then washed with the chlorine preparation.

Small quantities of water may be disinfected by boiling for five minutes. After cooling, a pinch of salt should be added and water poured back and forth from one container to another.

For chemical disinfection of small quantities, water should be measured in a clean container. The solution may be prepared by adding 10 teaspoonfuls of Chlorox to a quart of water. Add one teaspoonful of this solution to each gallon of water, stir thoroughly and allow to settle for 15 minutes.

The Health Department will assist on request.

THE ASHEVILLE TIMES

Asheville, N. C.

Monday, October 5, 1964

Floodwaters Recede After Heavy Damage In WNC

Pouring rains that sent torrents of water flooding down mountain streams and rivers brought uncounted damage to Western North Carolina yesterday and caused at least two deaths.

High water flooded the little town of Rosman for the second time in a week, blocked highways in several WNC counties, virtually cut off roads into Hendersonville for a while yesterday,

and undermined the roadbed of the Southern Railway Line between Asheville and Hendersonville.

The water at Rosman was receding this morning from an all-time record peak of 14.95 feet recorded at 1:45 p. m. yesterday. At 6:45 a. m. today it stood at 7.93 feet and falling.

The previous record was 13.90 feet in the great flood of 1916.

The U. S. Weather Bureau at Asheville Airport predicted decreasing cloudiness today and a fair to partly cloudy day tomorrow.

The Bureau's river advisory at noon today said that a crest of water moving downstream toward Asheville along the French Broad River should hit here about 5 a. m. tomorrow.

The peak is expected to be 12½ to 13½ feet, or approximately four to five feet above flood stage.

was drowned when he tried to drive his car through high water on Clear Creek road in Henderson County. The auto was swept off the road into a cornfield about 3:30 p. m., according to State Highway Patrolman Dan Frady.

The accident happened about two miles south of Hendersonville.

An unidentified motorist pulled Cantrell's body from the car, the officer said.

Damage from raging Little Tennessee River was estimated at over a million dollars in Franklin.

Early today water was receding at the Little Tennessee River Bridge but it was closed to traffic. Highways 28 and 441 were still under water but were open.

Cullasaja River, which intersects with Little Tennessee River about a half mile above Tennessee River Bridge, was receding. Flood waters where the rivers meet was the highest in history.

The Nantahala Power and Light Co. dam about three miles below Franklin held. A brick home belonging to Clyde Downs, a mile below the dam, was evacuated last night.

Water as high as four feet swept through business establishments on both the east and west sides of the Little Tennessee.

The Big Dollar Super Market on the east side of the river had four feet of water and the loss of stock was estimated by officials at \$60,000.

Franklin Airport was still covered by water but planes were moved to higher ground yesterday.

Stock on lower sections and the floor at Brown and Carson's Feed Store washed away but there was no estimate of the dollar loss.

Nantahala Oil Company had one 2,000-gallon tank, seven 560 gallon tanks and 42 275-gallon tanks swept away in the swirling water. The entire stock was valued at between 20 and 30 thousand dollars.

A 400 gallon oil tank at Brown's Esso Wholesale Co. was washed away and a 1,000 tank was in danger of falling.

Franklin Motel on the east side of Little Tennessee River Bridge had a complete loss of wall-to-wall carpeting in its 32 units.

Area Residents Prepare For Aftermath Of Flood

FRANKLIN (UPI) — Western North Carolina faced the threat of continued flooding today as torrential rains from fading Hurricane Hilda deluged the area where hundreds of persons were forced to flee their homes Sunday.

Red Cross and rescue squads workers remained poised and alert today, especially in the Marshall and Asheville areas, for new flooding. The French Broad River was to crest at 13-14 feet in Asheville and near 18 feet at Marshall in Madison County early today.

At least one person was killed and scores of families forced to leave their homes and seek safer shelter in a seven-county area Sunday when rain-gorged rivers and streams sent their swirling waters into mountain communities.

Damage was expected to run into the hundreds of thousands of dollars.

Rescue squads, who received high praise for their work during Sunday's emergency, evacuated scores of families from Rosman, Franklin and Hendersonville.

It was the second time within a week that Rosman was hit by flood waters from the French Broad River. Last Tuesday, 15 families were evacuated in the same area.

Hendersonville was reported surrounded by water late Sunday night and flood waters ran into business districts in Bryson City and Franklin.

Flooding also occurred in Asheville and other sections of Jackson, Macon, Henderson, Haywood, Transylvania, Madi-

son and Buncombe counties.

A man identified as William L. Cantrell of Rt. 6, Hendersonville, was drowned when gushing waters swept his car off the road and into a small lake five miles north of Hendersonville.

A student trailer park was reported washed away at Western Carolina College in Cullowhee. Small airports at Franklin and the satellite tracking station at Rosman were inundated. But the tracking station itself was not reported endangered. A secondary road leading to it was closed by flood waters.

Several state and federal roads and numerous county roads in the area were closed by flood waters or landslides.

Two earthen dams near Franklin broke Sunday afternoon and added their backed up waters to the overflow.

But Howard Burnett, a ranger for the U. S. Forest Service, said the flow from the broken dams was "just a drop in the bucket" compared to the excessive rainfall.

Burnett said eight feet of water covered a large area of the east Franklin business district.

Pete Harlan, North Carolina forest supervisor for the U. S. Forest Service, said "property damage is heavy and crop damage even worse."

Burnett noted that flash flooding "happened so fast, it was mostly just a matter of getting people out. It was just too late to get anything else out."

Many of those evacuated were housed in motels and hotels and fed in local restaurants in connection with the Red Cross work, or they moved in with relatives or friends.

Streams along the French Broad Basin will be very slow in returning to their banks because of the excessive rainfall, the Bureau predicted. This is particularly true of the Asheville area, the weatherman said, as the high water from Blantyre will cause a continued rise in the river here.

The water level at Asheville was 11.67 feet at 10:30 a. m. today.

The river crested at Blantyre, near the Henderson-Transylvania County line, at 12.48 feet shortly before 7 a. m. today.

In the 34 hours ending at 7 a. m., Rosman recorded 17.18 inches of rain, the Weather Bureau reported.

Other rainfall amounts during the same period were: Hendersonville, 8.55 inches; Sunburst, 4.60, Canton, 3.70; Fletcher (Meadow's Store) 5.60; Swannanoa, 4.20; Asheville Airport, 5.94.

The weatherman had the season's first frost warning in the wake of all this heavy weather. There is a chance of scattered frost between now and Thursday, he said, with nighttime low temperatures ranging from 35 to 40 degrees.

Earthslides were reported on several highways.

One of them buried a man identified by the Pickens, S. C. Sheriff's Department, as Jarrett Keith of Rosman. Officers said Keith and a companion, identified as Ansell Britton, were chopping a tree to clear it away from U. S. 178 in Pickens County when a landslide buried them.

Britton was reported buried to his neck, but managed to kick himself free.

At Hendersonville, a man identified as William Lewis Cantrell, 51, of Hendersonville RFD # and Commerce, Ga.,

Electrical appliances floated around in several appliance stores. Traded-in appliances at Bennett Electric Company were washed away. Plate glass windows in the building were also broken and a new color television set and a new refrigerator were swept away.

The Winn-Dixie building, occupied only a year had four feet of water but there was no estimate of damage to stock and the building.

A side building on an unoccupied structure collapsed and was washed away.

The Red Cross was standing by to care for those who need help as were rescue squads.

The home of Mr and Mrs. Wallace Stewart at Cullasaja was washed 1,000 feet downstream by the rushing waters of the Cullasaja, coming to rest against the Cullasaja Bridge. Neighbors had helped the Stewarts get most of their furniture out in time.

A dozen families were evacuated from their homes in the Cullasaja area.

The Asheville office of Southern Railway reported that two washouts of the trackbed, at Tuxedo and Naples, north of Hendersonville, had caused re-routing of the "Carolina Special" which makes a round trip run from Cincinnati to Columbia, S. C.

The train was rerouted to Marion on the C.C. & O. line, and from there to Spartanburg on the southbound trip, and followed the same route back. The train would ordinarily go directly from Asheville to Spartanburg through Hendersonville.

Rail traffic was still being rerouted today, but crews were working to repair the damage.

Water stood two to three feet deep in the south end of Hendersonville yesterday afternoon as Mud Creek overflowed its southern bank for about 1,000 feet.

George Tisdale, public relations director at the Southern Bell Telephone office in Asheville, said today that National Guardsmen in Hendersonville helped the company bring all its operators to the Skyland Hotel yesterday, where switchboards were set up in case of continued flooding. The operators manned the temporary switchboards all night, Tisdale said.

At 8 a. m. today, he said, 103 telephones were still out of order in Hendersonville, but company trucks were traveling all roads in the area, and crews had worked all night to restore service.

Some 150 telephones in Beverly Hills, knocked out by a shorted cable at Municipal Golf Course, were restored to service

about 9:15 p. m. yesterday, Tisdale said.

Long distance calls from the company's Asheville office, which normally number about 7,200 on a Sunday, according to Tisdale, went up to 13,375 yesterday.

Schools were closed today in Buncombe County, and in Henderson, Transylvania, Madison and Macon counties.

Hendersonville city schools were also closed and the Asheville-Buncombe Technical Institute was shut for the day.

Asheville city schools were operating.

Asheville recorded a total of 3.48 inches of rain during the 24 hours ending at 7 a. m. today.

Rosman had 13.10 inches during the same period, but only .98 inch of the total fell during the night, the Weather Bureau said.

Flood waters sent hundreds of persons fleeing from their homes yesterday. At least three small dams and several bridges were reported to have given way.

High water threatened a number of industrial plants and broke into at least two.

The Von Canon Furniture

The Asheville (N. C.) Times, Monday, Oct. 5, 1964

Massive Cleanup Is Started In City

Massive cleanup operations were underway in Asheville and Buncombe County today as flood waters which caused extensive damage yesterday and last night in low-lying riverside areas receded.

Employees of business establishments along Sweeten creek road and Brook street in the Biltmore area were busy with shovels, mops, brooms and water hoses as they cleaned mud and muck from floors inundated by rain-swollen Sweeten Creek. The creek was well within its banks this morning.

The creek, ordinarily a small meandering stream, became a raging giant early yesterday as torrential rains fell on the area.

Waters from the swollen French Broad River still covered much of Amboy road in the West Asheville section today, keeping the street closed to traffic. Water still covered portions of Riverside drive south of Hall street this morning, but the street was clear from Hall street northward.

Rain soaked earth gave way on Governor's View road yesterday afternoon, causing a cave-in, which carried away about half the roadway. The

plant at Whittier, near Sylva, had about 18 inches of water inside it according to owner Paul Von Canon.

His workers evacuated the plant about 5 p. m. yesterday, Von Canon said, and were able to return about midnight.

He would not estimate damages, but said it was mostly to lumber and shipping material. This morning the Tuckasegee River was back within its banks, he said, and employees were cleaning up the plant.

F. L. Hutchison, 13th division highway engineer reported that N. C. 191 (Brevard road) in the Bent Creek-Sandy Bottom area was open.

N. C. 191 was closed about 9 p. m. yesterday, Hutchison reported.

Roads in Marshall were open. Hutchison said, and Yancey and Mitchell counties had "no trouble to speak of."

There was a small washout on N. C. 226 in McDowell County, the engineer said, causing traffic to be held to one-way at a time.

T. M. Austell, district engineer at Hendersonville, reported this morning that U. S. 64 west had

been closed this morning at Horse Shoe, where the waters of Battle and Shaw's Creeks were about two feet over the pavement.

U. S. 25 north and south of Hendersonville was opened about 4 a. m. today, Austell said, as well as U. S. 176 south to Spartanburg.

U. S. 276 to Pisgah Forest was opened this morning out of Hendersonville, but was still closed out of Brevard, he said.

U. S. 64 east was opened this morning after being closed yesterday and last night by high water.

Near Rosman, the Mitchell-Bissell Co. factory was flooded when a big slide collapsed across U. S. 64 and into the French Broad River partly blocking the stream and diverting water into the plant site. The plant could not be reached by telephone this morning.

At Rosman, the Seventh-day Adventist Church was setting up a first aid emergency supply station in Rosman High School. Food, blankets and a limited supply of clothing and shoes were to be available.

road was open this morning, however, since half of the road is still negotiable.

Police department spokesmen said all other streets which had been flooded yesterday were open this morning.

Water from the raging Swannanoa River blocked traffic on the Old Swannanoa road into Biltmore much of the day yesterday, but the river was within its banks this morning.

Some water still stood in low-lying sections along the French Broad River.

At the Hicks Corp. on Riverside drive, the French Broad was still spilling water into the company's parking lot, but no water got inside the main building.

Jim Kuykendall, manufacturing manager said employees sandbagged around the building yesterday. He said water flooded the basement of the plant, but that pumps were manned throughout the night, keeping the water from rising into the manufacturing section.

One danger at the plant was that rising waters might reach an extremely hot furnace facility used in the manufacture of missile components, but the pumping operations kept the water out of the furnace area. An

explosion could have occurred had the water reached the furnace.

Plant officials and law enforcement agencies were still keeping a watchful eye on the situation at the plant today, but the danger appeared to be diminishing.

In Biltmore, Sweeten Creek began rising early yesterday morning, and by about 10 a. m. crept onto Sweeten Creek road.

Bruce Ridenhour, owner of Bruce's Sweeten Creek Drive-In Restaurant, said water stood about 14 inches deep in the restaurant at one time.

Ridenhour said there was little actual physical damage to the building, located just a few feet from Sweeten Creek, but added that the cleanup operation would be expensive.

Ridenhour said one of the reasons for the flooding is that the creek narrows as it winds toward Biltmore.

Lamar Dean Outdoor Advertising Co. on Sweeten Creek road was conducting cleanup operations this morning, but a spokesman for the firm said there was little damage to equipment.

Alvin Moore, president of Biltmore Tool and Supply Co. on Brook street in Biltmore, reported about \$3,000 damage to

merchandise. He said water was about 10 inches deep in the firm's storeroom, causing damage to precision tools stored there. Employees of the company worked until the early morning hours cleaning mud and muck from the building.

Water in the Biltmore section stood as much as three feet deep in some places during the height of the flood.

Jim Dry, office manager of Western Carolina Tractor Co. on Sweeten Creek road, said water ran 16 inches deep through part of the building. He could give no estimate of damage, but said it would be slight.

The Asheville Area Red Cross Chapter set up an emergency shelter in Lee Edwards High School yesterday afternoon to take care of anyone who might be chased from his home by the high waters, but the only persons who took advantage of the shelter were travelers trapped in the city because of flooded highways.

Marshall Upton, chapter manager, said five persons spent the night at the shelter. He said two

were students of Western Carolina College and two were on their way to Brevard.

Upton said the five persons were bedded down for the night after a supper of sandwiches and coffee. Red Cross personnel closed up the shelter about 6:30 a. m. today.

Upton urged any area residents whose homes might have been damaged by the high waters to contact the Red Cross if they are in need of help. He said the chapter could supply food and clothing and other assistance to flood victims.

Charles Dermid, city director of public works, said this morning that city street department crews were out in force cleaning up sections which were inundated. He said high water has blocked the entrance to the city garbage dump beside Hominy Creek, and that the old sanitary fill beside Riverside drive is being used temporarily.

Water was several feet deep along the Old Swannanoa highway into Biltmore during the height of the flood, but was re-

opened to traffic about 2 a. m. today as the Swannanoa River receded.

There were also reports from the Buncombe County Sheriff's Department that Emma road is still inundated and closed to traffic at Murphy junction, and that a cave-in had carried away about half of the roadway on Browntown road in the Newfound section.

Sheriff Harry P. Clay, who was abroad throughout the day and night keeping an eye on the flood situation and lending a helping hand wherever it was needed, said three houses near Thompson street in Biltmore were evacuated about 2:30 p.m. yesterday.

He said furniture in the houses was moved out, but that the water never got inside the houses.

The sheriff was also on hand when four unidentified men took a joy ride down the raging French Broad River in a motorboat. The turbulent waters capsize the boat, but its occupants managed to struggle to near the shore where Clay and other deputies help them ashore.

Clay said it was a miracle the men survived the dip in the raging, cold water. He added that the motorboat was sunk.

All deputies were on duty throughout the day, Clay said. Many of them worked far into the night.

Civil Defense staff members and volunteer workers were also out in force during the critical hours.

Mrs. Nora Gunter, county CD director, noted that all 10 rescue squads in the county were active. The CD office in the Courthouse served as an emergency communications center. A number of amateur radio operators stayed in contact with rescue units and directed traffic to trouble spots.

Rescue squads were engaged in activities ranging from pulling stalled cars from inundated highways and roads to pumping out flooded basements. They also gave assistance to various business establishments, helped residents of the Woodfin Trailer Park move their mobile homes away from the flood waters.

Flood Damage Will Run Into Millions

The Asheville Citizen
Tues., Oct. 6, 1964

Most of Western North Carolina Monday began digging out of the muck left in the wake of one of the most devastating floods since 1916. Damage is expected to run into the millions of dollars.

Franklin Mayor W. C. Burrell said damage there will run well over \$1 million.

But Asheville and Marshall still were braced for a new assault by the French Broad River. High water covered most of the Riverside Drive section near the depot in Asheville and was rising as darkness fell. Amboy Road also was closed to traffic.

In Marshall the high school and bridge, along with a few trees, were the only signs that Blahasset Island was under the thundering stream. Main Street merchants had their merchandise stowed well above floor level.

Weather Bureau officials predicted a crest of about 13 feet in Asheville at 5 a.m. Tuesday.

EXPLOSION FEARED

At the Hicks Corp. plant in Woodfin volunteer firemen from Woodfin, Haw Creek and Weaverville manned eight pumps in a two-day battle to keep cold flood waters away from an extremely hot furnace. It was feared that a combination of hot furnace and cold water

would set off an explosion strong enough to lift the roof off the building.

In addition to pumping water out of the plant, workers continued placing sandbags around the walls. At 9 p.m. Sheriff Harry Clay reported Hicks employees had run out of sand and were looking for more.

Also at Woodfin, a trailer park usually above the flood level was partially submerged. One trailer was damaged when its porch section was swept away. Other trailers were pulled to higher ground.

ONE-WAY TRAFFIC

A section of the highway shoulder dropped off Governor's View Road just north of N.C. 81 as a result of the soaking rains, and traffic is now reduced to one-way travel at that point, Charles W. Dermid, director of Public Works, said Monday night.

The damage occurred in a sharp curve and a barricade was erected, Dermid said. His department also placed a barricade at the city limits on Emma Road because of high water at the mouth of a creek under the Murphy-Knoxville junction of Southern Railway's lines.

There was little damage in areas where the water has receded, but Dermid said he couldn't make an estimate of the area where water was still rising on Meadow Road, Amboy

Road and Riverside Drive.

There had been no problems with sewerage facilities in the city, Dermid said.

National Guard units were called on duty in Asheville, but they were on a practice alert and did not assist in flood control. They did announce that they were available if needed.

Also in Buncombe County, the State Highway Patrol reported that N. C. 191 toward Brevard was closed to all traffic Monday night.

Macon and Transylvania counties, which appeared to have suffered the worst damage Sunday, were digging out from under Monday. Congressman Roy Taylor asked President Johnson to declare both counties disaster areas. Archie Noell, area Civil Defense director, asked Governor Sanford to declare Macon County a disaster area.

While most residents of storm-ravaged areas were able to begin work at cleaning up their homes, some found no house to come home to.

In the Cullasaja section of Macon County, the home of Mr. and Mrs. Wallace Stewart, formerly of Glen Falls, N. Y., was swept 1,000 feet downstream by the raging Little Tennessee River. Two other homes in the same section were swept off their foundations and 10 more were submerged ceiling-high by the waters, which damaged their entire contents.

Franklin businessmen were unable to reach a firm figure

in estimating damage.

Officials of Peak Line Furniture Co. estimated a loss of at least \$150,000. They said the figure could easily go over \$200,000.

In Transylvania County Red Cross evacuation centers were still in operation at Pisgah Forest Community Center and Rosman Grammar School. On Sunday 20 families in Rosman and 15 in Pisgah Forest were evacuated to the centers.

The Mitchell - Bissell plant near Rosman is expected to be back in operation Tuesday. The plant had six inches of water on its floor Sunday when a slide dropped into a stream above the plant and diverted water into the building.

The new Lake Toxaway dam held, with excess water running over a concrete spillway. No emergency drains were opened. A dam at the same site washed away during the 1916 flood.

In Jackson County the Von Canon Furniture Co. at Whittier will be out of production a few days. 10 to 15 thousand board feet of lumber washed away; electric motors and other electrical equipment were damaged by water.

The county was declared an emergency area from 5 p. m. to 10:30 p.m. Sunday and the Civil Defense unit was in command under orders of the county board of commissioners.

Henderson County residents will never know how much rain

fell during the Sunday flooding. The official rain-gauge was atop radio station WHKP, which was flooded out completely. The gauge washed away, authorities said.

Generally in Henderson County waters were receding, U. S. highways 25 south and north were open, as were 176 south, 64 east and west.

Damage was estimated at a half-million dollars.

The State Highway Patrol warned Henderson residents not to travel on secondary roads, since washouts, slides and weakened bridges posed a danger.

Coming fresh on the trail of the week-ends flooding are clearing skies and coolish temperatures according to the U. S. Weather Bureau.

The forecast for Tuesday is fair to partly cloudy skies, with

a high temperature of about 58. No rainfall is predicted.

Monday the mercury reached 57 after an early start from 46. For the 24-hour period ending at 7 p. m., .46 inch precipitation had been recorded.

Highway Damage Outlined

Devastating floods from rain-swollen streams played havoc with highways in the 14th Highway Division Sunday and Monday.

Many primary roads are closed because of slides and

washouts. A large number of secondary roads in most counties in the division—principally Henderson, Transylvania, Macon, Jackson and Polk — have received extensive damage, and many are impassable.

All new construction and improvements have been halted until the flood damage has been repaired, A. J. Hughes of Sylva, 14th Division engineer, said Monday.

The road picture as of Monday:

U. S. 64 between Highlands and Franklin will be closed for at least a week, depending on the weather.

In Jackson County, two bridges are out on Wayehutta Road near Cullowhee, and high water has marooned five families in the area.

N. C. 107 from Jackson to

Transylvania County was washed out, and N. C. 281 was closed.

In Transylvania, U. S. 276 was closed on both sides of Brevard—south to Greenville, S. C., and north in the Pink Beds section.

In Henderson, U. S. 64 at Horse Shoe was still under water, and probably will remain so until the French Broad River level drops considerably. N. C. 191 at Mills River was still flooded.

The Rosman satellite tracking station road was washed out at a fill, and the facility is accessible only by an old gravel road.

Many roads, mostly secondary, were still under water in Haywood and Swain counties.

Many secondary roads throughout the division were washed out or covered with slides.

Diary Of A 'Day Off:' Journey Through Floodlands

By BEV BALLARD

Citizen Staff Writer

The rain fell relentlessly.

Assigned to find the news and tell it to the reading public, the reporter drove westward into a day of disaster.

A diary of this journey goes like this:

Sunday, Oct. 4: Awoke to the constant beating of rain drops on the windows and rooftops. First thoughts are that it is a good day to spend in bed and, listening to the sleep-inducing rhythm of pattering rain, swept by gusts of wind, turn over and try to return to slumberland.

9 a.m.: Unable to sleep, turn on bedside radio to hear reports of rainfall and threatening floods by waterlogged streams throughout Western North Carolina.

11 a.m.: Venture out to get something from store and find the rain really had fallen during the past 12 hours. But, today's my day off, keep telling myself.

PATTERN CHANGED

Noon: A phone call changes the pattern of a day at home to one of coping with windy, wet highways in search of a news story. Destination: Macon County and area feeling effects of broken upstream dams on several rivers.

About 1 p.m.: After viewing the French Broad River's hasty rise from the Smoky Park Highway Bridge, instinctive nature told this reporter he was in for quite a day of it. As had been the case on numerous such occasions in a 15-year career as a newspaperman in North and South Carolina, covering two tornadoes, half a dozen or more hurricanes and an early morning airliner crash,

the same feeling of excitement and anticipation fell upon the quiet interior of the car as hum of motor combined with the swish-swash of windshield wipers and splash of water from rainfilled highway.

FLOODING FIELDS

1:15 p.m.: Had seen some flooding of fields in the Enka-Candler section and at Clyde from highway, but didn't stop. Suddenly came upon a scene of activity east of Waynesville on Highway 19-23A. Stopped to find a late model convertible auto submerged all but about 10 inches in a flooded creek. Ripped knee out of pants and some flesh trying to get down for a better observation point and to talk with man standing at scene. Later found local policeman who said car belonged to C. D. Ketner, who'd apparently run off highway into creek and was swept 200 feet before being pulled from auto and taken to hospital. Condition was reported as good. He narrowly escaped drowning.

2 p.m.: Arrived in Sylva and told by local authority of closing off of Highway 107 into Cullowhee because Tuckaseegee River had gone on rampage. Dozen or more mobile homes in trailer park had been evacuated and were threatened to be carried into the river's destructive current at anytime. Also told 107 closed south of Cullowhee because of landslide and rock slides, plus high waters.

STOPPED ON BRIDGE

2:15 p.m.: Stopped on bridge at Dillsboro after turning south toward Franklin. Observed that at least eight or ten buildings partially under water from flooding Tuckaseegee at that

point and small dam being overrun by tumultuous flow of red, thick, muddy river.

2:40 p.m.: Arrived on northeastern side of Franklin after having seen numerous bridges washed out along Rutherford Trace on northern side of Cowee Mountain. Also, halted at one point where farmer was attempting to get marooned cattle to higher ground from a swamped pasture. A neighbor, standing by to help, said already two of the cows had been swept down the mountain by the fast-rising stream. First sighting of Franklin flood came with spine-tingling sensation. Many businesses and homes only partially visible above flood water. Haywood County Rescue Squad, standing by near intersection of Highways 64 east and 23 north, said water was rising fast and amid conversation, radio intervened to report another dam at Highlands had given away.

3 p.m.: Made first phone call to newspaper and informed them that to get the story, would have to travel about 20 miles to a point only two miles away. Left what is known as East Franklin and went downstream to cross Little Tennessee River over Iotla Bridge. Viewed numerous homes along river banks that had been abandoned because of invading waters.

DOWNTOWN FRANKLIN

3:30 p.m.: In downtown Franklin, having just returned from seeing the flood from the southern side. Rescue squads men informed where to go for

news of evacuees from 30 or 40 homes affected by the flood in Franklin. Made second call to newspaper. Got lunch, finally.

4 p.m.: Went to home of Mrs. Lester Conley, correspondent for The Citizen. Made further phone contacts to gather bits of information and listened to local radio station making constant emergency broadcasts about incidents connected with flood situation.

4:30 p.m.: Back at side of flooding Little Tennessee and Cullasaja rivers, which join just east of Franklin. Potts told of having lost a unit of the Rescue Squad while trying to save one of the earthen dams up on Middle Creek Sunday morning.

TWO HOUSES GONE

4:45 p.m.: More reports arrive about situation in Cullasaja. Two houses washed against the bridge there—they belong to Wallace Stewart and Gaylord Reid. Four feet of water stands across Highway 441 at Otto, six miles south of Franklin. Water measures 48 inches at Indian Mound on Highway 64 east.

5:20 p.m.: Conducted interview with Mr. and Mrs. Stewart on loss of home. Getting more reports on rising water, no cresting sighted. Rain falling relentlessly.

5:40 p.m.: Return to home of Mr. and Mrs. Conley and call office again. Information now has it that Highway 28 and Iotla Bridge are closed, as is 23 north at Dillsboro and 441 south at Otto. Appeal is made by radio to people living in Highlands to use water only as absolutely essential since main water line across river cut in

half by raging water and debris.

PHONE LINES JAMMED

6:45 p. m.: Begin attempts at getting phone line from Franklin to Asheville and final call, as it turned out from Franklin. (Phone lines jammed by LD calls). During half hour it takes to get phone call out, hear on radio that Atlanta-to-Asheville Trailways bus is stranded with eight passengers on 441 south at Otto. Also, notified there are no routes open leaving Franklin.

7:30 p. m.: Complete dictation of story on phone and tell office am stranded for night. Leave Mrs. Conley's home and return to waterfront to find the water has crested at 12 feet above bankful at about 7 p. m.

RAIN SUBSIDES

8 p. m.: Conditions better. No more rising water. Rain has subsided considerably. Contact Macon Sheriff Bryce Rowland, who tells of routes he believes might take an adventuresome soul out of Franklin and eventually to Asheville. But, he wants to check it out with Highway Patrol and promises to call after making contact with Bryson City through a patrol car situated on Highway 28 west of Franklin.

8:45 p. m.: Word comes from Sheriff Rowland that by following Highway 64 west to Wayah Mountain Road and thence across mountain north to Highway 19 and east on 19, one might reach Bryson City, where indications were conditions had become much better than earlier in afternoon. Visit VFW Club where rescue units had set up headquarters and where women of Junior Women's Club and Women's Auxiliary of the VFW were serving stranded persons, including the eight that had been stranded two hours on that Trailways bus at Otto. Talked with some of people and found Richard Riegg of Waynesville, a student at Riverside Military Academy, Gainesville, Ga., en route home, as was Dick Chambers of Asheville, employe of The Atlanta Journal and former employe of The Citizen-Times. Decide to bring them along and attempt round-about route home.

Rain returns along with a lot of fog. Fog gets worse as we climb almost in a spiral to crest tall Wayah Mountain. Once across, however, going is better. Dodge several mountain slides en route and see rushing stream alongside highway, almost lap-

Size Of Flood Surprises Pilot, Lensman During Mountain Tour

By EARL FREEMAN
Citizen Staff Writer

Water, water everywhere. . ."

At least that is the way the French Broad River valley looked from the air yesterday.

Citizen-Times Photographer Malcolm Gamble and I took off in a light plane from Emma Air Park about noon Monday to observe flood conditions in the area—we saw far more water than we ever expected.

After take-off we swung over the French Broad south of Newbridge, but things didn't look too bad along that stretch of the stream.

We headed south and were amazed to find the industrial area along Riverside Drive still inundated to the extent that it was.

Gamble shot several pictures and we headed on upstream.

Owen Field and the race track were submerged along with a long stretch of Amboy Road. Gamble fired away with his camera.

A field to the east of Owen Field and south of the river on Biltmore estate looked like a large fishing lake.

Farther upstream, where water covered a large portion of Biltmore Estate, we saw a truck which appeared to be about half submerged. Gamble continued to shoot pictures.

A house was surrounded by deep water.

We had only a little over a half tank of gas in the plane—probably somewhere between seven and eight gallons—and had planned to land at Myer Flying Service to fill up and add a quart of oil (there was no one at Emma to provide this service when we left.)

However, when we arrived in the vicinity of Hendersonville we could see that most of Oscar Meyer's airport was under water.

With only a limited supply of fuel left, we turned southwest toward Brevard and Gamble shot up the rest of his film.

There was considerable water in Henderson and Transylvania counties.

Many of the highways in that area were covered with water.

Submerged highways presented no problem to our way of travel, but if an occasion to make a forced landing had arisen, I'm sure Gamble and I both would have wished for floats instead of wheels on our airplane.

The area to the south and southwest of Asheville Airport was one huge lake with water lapping up almost to the south end of the airport runway.

Having covered as much territory as we could on what gas we had, we pointed our nose north toward Emma Air Park.

Fighting a headwind to return to home base after completing a mission is not exactly a tension-free sort of flight, but it did feel good to get back on high, solid ground with some fuel left in the tank.

ping at our tires in places. What a harrowing experience! After what seemed like hours of creeping along the twisting road across Wayah, we arrive at intersection with Highway 19 and turn east toward Bryson City.

11:15 p. m.: In Bryson City we find things almost normal, with exception of swollen Nantahala River running alongside highway, but no menace. We direct our friends northward on Highway 28 at Orman, cross the Little Tennessee River on the high bridge, very much aware of the rampaging stream below.

11:45 p. m.: Arrive in Sylva

after having caught glimpses of flooded areas all along the Tuckasegee River. Apparent that Whittier and Dillsboro hit hardest. At points on the highway, we see where water had once covered the road and had eaten out at rocks and earth on the upper side. Slides and washouts slow our progress. Call office from Sylva to report we "arrived from the other side of nowhere" and back within range of home.

2 a. m.: Home again, and are we glad! Must admit we have had our fill of suspense, harrowing moments and water, water, water, down from the hills and skies.

The Asheville (N. C.) Times, Tuesday, Oct. 6, 1964

French Broad Crests Here, Starts To Ebb

Rain-gorged rivers and streams in Western North Carolina were sinking slowly back to their regular courses today after a wild week-end spree that left wreckage measured in millions of dollars along their banks.

The French Broad River, which caused most of the damage, crested at 12.7 feet at Asheville at 1 a. m. today—almost exactly what the Asheville Weather Bureau had predicted.

By 10 a. m., the water level had fallen to 11.81 feet, although businesses along Riverside Drive were still flooded and water was still over the road itself.

Forecaster Jim Jenkins at the Asheville Bureau said that waters of the French Broad were expected to begin subsiding all along its basin by mid-day.

The crest was moving downstream from Asheville this morning. At Marshall, the level was 14.45 feet and rising slowly at 7 a. m. It was expected to crest at about 15 feet, five feet over flood stage.

The Weather Bureau issued a frost warning for tonight, with a prediction of near-freezing temperatures and moderate to heavy frost.

Skies will be fair tonight, and tomorrow will be fair and a little warmer. The high today was expected to be around 58, the low tonight near 32 and the high tomorrow about 64.

Scattered frost was reported in the Asheville area this morning as temperatures dropped to a low of 31 degrees at Weaver-ville, 33 at Meadow's Store, near Fletcher, 25 at Grandfather Mountain and 30 at Canton.

W. Riley Palmer, Buncombe County farm agent, said he had received no reports of frost damage last night, but that tender garden crops and late tobacco probably were injured. A good deal of silage corn is still in the fields, he said.

"The real damage will come tonight if the temperature gets around the freezing level," he said.

Marshall High School, on Blamahassett Island in the middle of the river, was closed, and will probably remain closed the

rest of the week, according to a school spokesman. The island was completely under water. Nearby Walnut school will probably be closed the remainder of the week, also, the spokesman said.

Etowah School in Henderson County was reported shut down today, but other schools resumed operation this morning.

Further downstream from Marshall, the river at 6:30 a. m. was reported rising slowly from a depth of 15.5 feet at Hot Springs, where flood stage is 13 feet. The water was not expected to go higher than 17 feet there.

In Asheville this morning, Buncombe County Rescue Squad members using a motorboat rescued the drivers of two trucks who had ignored warning signs on Meadow road and stalled their trucks in deep water.

Capt. Earl DeWeese of the Asheville Police Department reported that three trucks traveling northeast from Biltmore, had tried to negotiate the submerged road before daylight and gotten stalled one after another in the vicinity of the Slosman Corp.

Two of the trucks were tractor-trailer rigs, DeWeese said, and the third was a smaller, privately-owned vehicle.

One of the drivers, an unidentified trucker from Greenville, S. C., waded back to dry land and notified police that two men were still marooned.

The men had been stuck in their cabs for three or four hours when the boat arrived to take them out, DeWeese said.

The water was about five or six feet deep where the trucks' engines flooded out in a dip of the road, according to the officer.

The two rescued men were identified as J. M. Deman of Atlanta, a driver for the Meade Trucking Co. there, and W. A. Wilson of 202 Westwood Place, Asheville, who was driving his own truck.

DeWeese said there were signs on the road saying "High Water," and "Detour."

The men said somebody in Biltmore had told them they could get through, DeWeese reported.

Flood damage to roads, businesses and lands was extensive throughout the mountain area.

In Franklin, where water swept right through the town's

main business section, Mayor W. C. Burrell said the loss would be well over \$1 million.

Officials at the Peak Line Furniture Co. in Franklin, a manufacturer of tables, said damage was at least \$150,000 and could go over \$200,000 easily.

Roy Fouts, Macon County Red Cross disaster chairman, said this morning that damage at Franklin would run "into the millions."

The Seventh-day Adventist Church of Charlotte was operating a relief van today at Cullasaja School, passing out supplies to families whose homes were damaged by the flood.

The high water at Franklin had receded from all but two places on the area's highways. It was still over U. S. 64 below the Franklin Airport and over U. S. 441 of the Tennessee bridge.

Ernest Rodney, chief meteorologist at the Asheville Weather Bureau, said today that rainfall at Rosman from Sept. 28 until 7 a. m. yesterday totaled 34.93 inches, and that 17.18 inches fell there during the time of the latest storm.

Rainfall at the Weather Bureau during the same period was measured at 11.48 inches, he said.

Rodney released the following at noon today showing high water marks reached at various points along the French Broad:

Rosman, 14.95 feet at 1:45 p. m. Sunday — flood stage 8 feet; Blantyre 25.48 feet at 7 a. m. yesterday—flood stage 17 feet; Asheville 12.70 feet at 1 a. m. today — flood stage 8 feet; Marshall 14.45 feet at 6:30 a. m. yesterday — flood stage 13 feet; Biltmore on the Swannanoa River 11.13 feet at 3 p. m. Sunday — flood stage 12 feet.

A second crest was moving downstream from Asheville this morning after the 1 a. m. peak here, but the river was expected to drop slowly in its wake.

The water level at Asheville stood at 11.70 feet at 11 a. m. today.

In Henderson County, two more highways that were under water yesterday emerged today and were reopened to traffic.

U. S. 64 at Horse Shoe was open again and N. C. 191 at Mills River was once more dry land.

N. C. 191 was still closed at Bent Creek, in Buncombe County, however, the State Highway Patrol reported this morning.

A summary of road conditions:

U. S. 64 between Highlands

and Franklin will be closed for at least a week, according to A. J. Hughes of Sylva, 14th Division Highway engineer.

In Jackson County, two bridges are out on Wayhutta road near Cullowhee.

N. C. 107 from Jackson to Transylvania County was washed out and N. C. 281 between Tuckaseegee and Lake Toxaway was closed because of a washout.

In Transylvania County, U.S. 276, closed by high water on both sides of Brevard yesterday, was reported open again today, although traffic was one-way in some places.

Many roads, mostly secondary, were still under water yesterday afternoon in Haywood and Swain counties.

Hughes said it would take two to three weeks to clear up slides and repair damages to the highways in his division.

In Henderson County, approximately 1,200 to 1,300 acres of corn were reported badly damaged by the high water.

Recently seeded rye, permanent pasture and hay that had not been harvested were reported damaged. Soil erosion was severe on fields, road banks and along stream channels.

Apple growers were also delayed about 10 days in harvesting their crops.

Damage in Henderson County was estimated at around a half-million dollars.

Henderson county's official gauge to measure its rainfall in Hendersonville was washed away from its place atop flooded-out radio station WHKP at the peak of the flood.

All major highways in the Hendersonville area were open today, according to a highway department spokesman, but a number of secondary roads were still closed.

THE SYLVA HERALD

Serving All The Interests of Jackson County

Sylva, N. C., Thursday, October 8, 1964

Some Homes, Industries, And Roads Suffer Heavy Damage In Flood

Emergency Declared For About 12-Hour Period

Jackson county was declared in a state of emergency Sunday when waters of the Tuckasegee River and other streams rose, flooding some homes, industries and businesses. Some people living along the Tuckasegee River evacuated their homes during the period.

Rainfall was heaviest in the southern end of the county with a reported nine inches of rain in a two-day period at Tennessee Creek.

Grounds all over the county were fully saturated with water when the Saturday night and Sunday deluge came. Eight consecutive days of rainfall recorded at Thorpe Power House totaled 14.78 inches. More than that fell at Tennessee Creek.

Scotts Creek, with headwaters in the northern end of the county, was running above normal, at bankful, but below what is considered flood stage. Other streams north of Cullowhee were above normal but below flooding, such as Oconaluftee at Cherokee.

The southern end of the county south of the Blue Ridge Continental Divide also experienced heavy rains and damages, as roads and a bridge were washed out.

The Jackson County Rescue Squad was alerted about 10 a. m. Sunday. By noon the conditions had worsened to a degree that State and Area Civil Defense Headquarters and the County Board of Commissioners declared a state of emergency and the Jackson County Civil Defense became responsible for the welfare of the people and were in complete charge.

Rescue Units were stationed in various points in the county directing traffic and evacuations. Civil Defense Director Boyd Sossamon said over 400 volunteers were involved in the work.

Civil Defense headquarters were set up at Sylva Fire Station and five telephone lines were installed for communications to all parts of the county.

As a result of high water along the Tuckasegee River, NC 107 was closed. The highway between Sylva and Cullowhee was under water in two places. Water was headlight deep on autos on NC 107 at Ashe Bridge. There were also slides on NC 107.

Highway 281 was washed out in two places and there were

several slides. There were slides on US 19A-23 and US 64 west of Cashiers toward Highlands.

State Roads 1120 (from Glenville to Sapphire Valley) and Cedar Creek Road were washed out. A fill on Norton Road sank. Blocked by slides were State Roads 1731 (Wayehutta), 1344 (from Webster to Ashe Bridge), 1345 and 1735 (at East LaPorte), Whiteside Cove Road.

Water was across the old Franklin Road at Riverside Cottages, and got up in the cottages. The river road from Dillsboro to Webster (SR 13-59) was under water also.

14th Highway Division Engineer A. J. Hughes said damage to bridges lost was estimated at \$30,000. One lost was across the Tuckasegee off Wayehutta Road to five homes. The old railroad bed is being used for access to the homes until the bridge is replaced.

The road damage, Hughes said, would run into thousands of dollars.

All Jackson county schools were closed Monday due to the road conditions. All but Glenville and Cashiers were back in classes Tuesday. Glenville and Cashiers resumed classes Wednesday. However, all school buses could not make complete runs due to roads.

A footbridge at Whittier, owned by Dillard Construction Company, was washed away. The company will replace the bridge, Hughes said. A swinging bridge at Tuckasegee crossing the river at E. E. Brown's house was washed down.

Battle's Trailer Park at Cullowhee was extensively damaged.

The Paul L. Von Canon, Inc., furniture plant at Whittier had 18½ inches of water in the entire plant. The water crested there at 10 p.m. and was out of the plant by midnight. Plant officials stated the firm lost between 10,000 and 15,000 board feet of lumber, with some floating down the river; 30 to 35 electric motors were damaged and had to be sent off to be repaired; considerable damage in packing and shipping department where several thousand dollars worth of shipping cartons were lost; lost much of the material ready for assembly into beds; lost few samples ready for showing at High Point market; outside

fence washed down in three places with entire west end all down. The water got in electrical and telephone conduits. Flood silt was from a thin coat to two inches deep inside the plant. The officials stated that production would be delayed by several days and that no estimate in dollars was made but damage was "considerable."

Water got up into the Whittier Post Office.

Smoky Mountain Fiber Company at Tuckasegee also suffered considerable damage.

Due to the road between Sylva and Cullowhee being closed, WCC students returning to campus from a week end at home were directed to Civil Defense Headquarters.

The local Red Cross Chapter cooperated fully from the beginning in trying to alleviate the difficult conditions connected with the flooding waters Sunday. Local office personnel were on duty into the night and all day Monday assisting with placement of students and others displaced from their living quarters.

Some 140 students were given overnight housing and meals during the emergency.

Red Cross Field Representative Paul Jackson was here Monday surveying the damage and checking to see what the Red Cross could do. He was accompanied in his rounds by Ben Cabe, captain of the Rescue Squad, and W. B. A. Culp, a member of the local chapter's board of directors.

Jackson reported that a case worker would be sent in to visit individual families which have been affected to see what help can be given. Any family in the county in distress because of the flood conditions is invited to contact Mrs. Fred Williams, executive secretary of the Red Cross Chapter.

The emergency was declared lifted at 11:55 p.m. Sunday.

Radio Station WMSJ remained on the air in emergency broadcasts until the emergency was declared lifted.

The Civil Defense Director said Dr. Quinn Constantz was appointed as officer in charge in Cullowhee after the area was cut off from Sylva. "He did a splendid job," Sossamon said. Sossamon also issued a statement expressing appreciation to everyone who pitched in and helped during the emergency. "The way the people cooperated and wanted to help was overwhelming," he said.

The 14th Highway Division engineer said he could not give enough praise to the Civil Defense, radio station, law officers (police, Highway Patrol, Sheriff's Department) for the outstanding way they helped during the emergency.

Among many others extending congratulations to the Civil Defense in the smooth way the emergency was handled was the medical staff of C. J. Harris Hospital. A letter from Dr. R. W. Kirchberg, medical staff chairman, on behalf of the staff, perhaps is typical of the feelings:

"In the recent emergency we feel that the Jackson County Civilian Defense has proven itself to be most efficient in both organization and performance of duties. This efficiency was reflected in the people of the community by the high morale and the total lack of panic on the part of the people you so ably served."

High Water Washes Away Some Bridges

By Mrs. Walter Wilson

I guess the heavy rain that started falling Saturday night in this section is the most talked about thing just now. The water did lots of damage to the side roads especially in the Pumpkintown area. Several bridges to homes were washed away in Zion Hill Community. The blacktop road is undermined near the home of Mr. Alonzo Woodard.

The water level at the Hall Snack Bar was some three or four feet at the basement.

Whittier News

By Zennie R. Peyton

Whittier is cleaning up after the Sunday flood. People who moved from their homes are moving back and putting their things back in place. Water is being pumped from cellars. Thad Varner is getting his store cleaned and straightened out. Things are being put back to normal at the Von Canon plant.

The swinging bridge is gone from across the river. The school bus is using the detour to get the children to school.

But everybody is thankful it wasn't worse than it was.

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and
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79th Year — No. 41

Franklin, N. C., Thursday, October 8, 1964

Price 10 Cents

Twenty Pages

Rampaging Flood Batters County Sunday

Personal Property Losses Could Soar Over Two Million

Triggered by an already saturated earth, torrential rains poured tons of thundering water out of the highlands above Franklin Saturday and Sunday, causing the most devastating and costly flood in the history of this small mountain community.

Property damage alone is expected to hit \$2 million county-wide, with businesses in the river bottom sections of "Loganville", on the Franklin side of the Little Tennessee River, and East Franklin laboring under at least three quarters of a million of this estimate.

Damage to highways and rural roads in Macon County is estimated at \$75-100,000. Two bridges were washed out — the Asbury Gregory and the Peak's Creek bridges on the Cullasaja and two swinging bridges on the Little Tennessee in the Cowee section. Rural roads were cut up badly by fast water and were washed out in a number of places.

Agricultural damage from the flood and the recent drought (the latter item is included in the estimate because of the effect it had on crop yields) totals \$511,000, according to officials of the county Extension Service, the A.S.C., and the F.H.A.

Request Aid

Gov. Terry Sanford has taken steps to ask President Johnson to have the area declared a disaster area, and therefore eligible for disaster relief. Congressman Roy A. Taylor has also informed the White House of the county's plight and also requested that it be declared a disaster area.

Flooding in the business area ranged from a few inches to more than six feet in a dry cleaning establishment on the low side of Main Street.

Meanwhile, with philosophical good humor and perseverance born of the mountains, Maconians hard-hit by the flood have rolled up their sleeves and are cleaning up the damage.

Loses Home

Some, however, like the Wallace Stewarts, of the Cullasaja community, have little or nothing left. The rampaging waters of the Cullasaja River ripped their

Vice-president and general manager, Howard Halthcock, estimated damage to the plant's contents at \$225,000 and added, "that may be too low . . . we haven't saved a thing." As he talked, plant employees (43 are on the payroll) were hauling out soaked and muddied pieces of lumber once destined to be furniture for burning.

In the main "Loganville" business section, the new Winn-Dixie super market took the worst beating in loss of merchandise, but the building was undamaged. Winn-Dixie officials, working around the clock to clear out the damaged merchandise, restock, and get back in business declined to estimate the loss. However, others placed it at \$75,000 or higher.

Winn-Dixie used an end-loader to load trucks hauling away the spoiled and damaged foodstuffs.

Paving Ripped

At least \$8,000 damage was wrought by the rampaging flood waters to the Winn-Dixie parking lot. Huge chunks of asphalt paving were ripped up by the strong current circulating through that section of the business district. Howard Stewart, who leases the building and parking lot to Winn-Dixie, Tuesday had begun work preliminary to repaving.

modern summer home from its riverside foundation early Sunday and slammed it into the Cullasaja Bridge below, where the water pounded it to pieces. Portions of the house were found miles below.

Several other homes in the Cullasaja River basin were bowled from their foundations and partly destroyed. Still others were flooded or damaged by the flash flood that had its beginning with at least ten inches of rainfall in the Highlands area beginning about 7 o'clock Saturday night.

Heaviest concentration of damage, however, was in the howling East Franklin and "Loganville" sections of Franklin, where most of the town's post-war business expansion has taken place.

Hardest Hit

Most severely damaged was Peak Line Furniture Company in the Bonny Crest section. Water topped a high dike around the plant and poured inside the grounds, reaching a level inside the plant of six feet.

Heavy losses also were suffered by the new Franklin Tire and Appliance Company, which only moved in to its new one-story building across from Winn-Dixie last month. Damage here was estimated at between \$35,000 and \$50,000. About all that was saved was the store's tire inventory.

Bennett Electric Company reported damages totaling \$30,000 and Bill Bennett said all of the appliances, new and old, were total losses. Included in the inventory were two expensive color TVs, along with a large number of major appliances, like deep freezes, refrigerators, and ranges.

Station Damaged

A service station in the "Loganville" section, Huscusson's Esso, was heavily damaged. Two expensive outside ice-making machines and a number of other food vending machines operated by Huscusson's for after-hours customers were destroyed by the flood waters. Don Huscusson set damages at \$15,000.

Another "Loganville" business, R and W Motors, at the foot of Town Hill, was struck with water from two sources — the Little Tennessee and a kitterish Frog-town Branch that became a tiger under the influence of added water. A number of R and W used cars on an outside lot were completely inundated by the high water.

A Big Thank You

The willingness of the people of Macon County to help each other in time of trouble has never been better displayed than during the flood. It was wonderful.

Law enforcement officials, charitable and civic organizations, local business firms, Macon Rescue Squad, and state highway employees all went all out to do what ever they could.

However, this newspaper would like to single out one business for doing a particularly outstanding job.

Radio station WFSC dropped its regular business and took up the job of getting the news of the flood and flood conditions to the people of the area. Besides 18 hours of continuous broadcasting, during which time WFSC completely abandoned its commercial business, staff members answered hundreds of phone calls. They served as the communications nerve center for flood rescue and traffic routing efforts. They helped save much property and perhaps lives. We feel we speak for all the people of Macon County when we say to radio station WFSC and each member of its staff, "Thank you!" (Bob Sloan, Publisher)

Reid Womack estimated damages at \$25-30,000. At the height of the flood, five feet of water stood in the motor company show room.

Across the river, in East Franklin, Town Motel reported damages to carpeting and other furnishings at \$40,000, while the Big Dollar Super Market estimated its loss at \$30,000, and the DeSoto Trail Restaurant at \$20,000.

One East Franklin business, Macon Bowling Center, thought to be a total loss at first, fared better than most because the building rested on a high foundation and the bowling lanes themselves were erected on a second floor above the main floor. High water tipped just a portion of the lanes at the south end of the building and owner Earl Garpow estimated that "\$10,000 should put us back in business." The automatic pin-setting machines were damaged by the water and will have to be overhauled, he said. Only 14 inches of water came inside the building, as contrasted to some four or five feet that flooded other buildings in East Franklin on the same level.

Flood Plan Used

High water marks inside the buildings in the flood area ranged from a few inches at Macon Parts and Equipment Company, where employees utilized a "flood plan" and used sandbags to divert most of the water away from the building, with the result that it received no damage, to more than six feet at City Dry Cleaners across the highway next door to Huscusson's Esso.

It was a perfect situation for a flood Saturday. The ground was already saturated with heavy rain of a week ago. At that time, between four and eight inches fell over the county.

So, most of the water that fell Saturday and Sunday was run-off water, rejected by an already filled ground.

A Sitting Duck

The East Franklin—"Loganville" area is a sitting duck for high water — an

+++

NOTICE

Most businesses in the flood-stricken area of Franklin are back in business on a limited basis ("Not up to snuff, but we's working," says one), or will be by the week end.

+++

easy target for a "double-barrel shotgun" of trouble loaded with water from both the Cullasaja and Little Tennessee, which converge just above Franklin.

And the lowlands where the flood damage was concentrated once belonged to the river — it is mostly fill dirt dumped in since World War II to satisfy the appetite of expansion for a town that has little stretching room.

All of Franklin's Oct. 4, 1964 troubles began when the river, swollen by two large streams fed by torrential downpours in the higher elevations, started retaking land that progress has produced.

Rain began falling shortly after supper and it fell steadily during Saturday night and most of Sunday. Unofficial reports had rainfall at some points in the Highlands area at fourteen and a half inches.

Dam Breaks

By mid-morning Sunday, reports filtered down from Highlands that a small private lake in the Sealy section had broken and several others were expected to go at any minute. A least two more did break later, adding to the water woes of the Little Tennessee as it coursed out of Georgia toward Franklin.

And the Cullasaja River, which drops about 2,000 feet from Highlands to Franklin inside a distance of some 25 miles, was running high water with tremendous force—"Like going down a gun barrel," declared a resident of the Cullasaja Gorge.

A small private empondment on the gorge end of Buck Creek added more water when its "dry wall", weakened by the high water of last week, gave way. This was at the Laughridge lake. And a small dam at Whitmire's quarry above Gneiss gave way.

Heaviest damage to homes and bottom land occurred from Gneiss through the Cullasaja community — an area known as the Cullasaja River basin.

The Wallace Stewart home along the banks of the Cullasaja was battered from its foundation and destroyed in the flood waters. Only last week, the Stewarts, summer residents from Rocks Beach, Fla., were forced to abandon their home for a couple of days when flooding came within inches of the house. The house was practically new—built just over a year ago.

Big Flood 66 Years To The Day

Exactly 66 years ago to the day of Franklin's storied "big flood", the waters again rose in what will probably go down in history as the granddaddy of them all.

On October 4, 1898 (it was Tuesday), flood waters poured into the bottoms east of Franklin and rose about two-thirds or the way up the Indian Mound (see old photo).

And it was October 4 (last Sunday) when the waters again rose, knocking a large portion of Franklin's business district to its economic knees.

Save Very Little

Neighbors aroused the Stewarts early Sunday morning when the waters of the latest flood rose quickly. It was almost over their heads when they got out. They saved only a little furniture and a few belongings, and most of the contents went down the river with the house.

Above the Stewart's, the Brown house — newly completed — was knocked from its foundation and badly damaged.

The Gaylord Reed's, who also were forced to evacuate their house during last week's flooding, fled once again. This time the new frame house, which is owned by Mr. Reed's sister-in-law, was bowled off its foundation and damaged extensively.

The John Holland house, below Cullasaja School, was flooded to the window tops. The Holland's furniture and personal things were soaked and damaged.

Houses Flooded

Homes owned by Sam Keith and Vergil Watkins also were flooded by the high water, as were other cottages in the area close to the river.

As dawn broke over Franklin, radio station WFSC went on emergency alert, rallying everyone who wanted to help cope with the mounting emergency.

Principal Weaver Shope set up an emergency evacuation center at Cullasaja School for those forced to flee their homes because of the rising river.

The water may have been as high, or higher, back in 1898 than it was Sunday, but there was mostly bottom land back then, not a highly concentrated business area. Consequently, property damage was negligible—maybe a house or two flooded and some livestock lost, but certainly nothing to compare to the damage wrought in the latest liveliness of the Little Tennessee.

Then there was the flood of July 1916. Old timers recall that it equaled the 1898 flood. Again, property damage was not of major consequence. In August 1940, the river again jumped its banks, cresting at 12.5 feet, and again in 1949 (June), cresting at 12.85 feet. It only reached 10.54 feet in March of 1952.

Fortunately, telephone service was never disrupted in the county and those in trouble were able to call out and request help.

Squad Alerted

Members of the Macon Search and Rescue Squad rolled into the Cullasaja area to help with the evacuation operation. Rescue squads from Haywood County, and later in the day from Graham County, answered the emergency call from Macon County.

By 11 a.m. Sunday, the situation had worsened to a point where Methodists in Franklin decided not to hold regular worship services. Instead, they offered their own services in meeting the emergency.

It rained harder and the river kept rising.

About 11:15, US 64 just below the Bethel Methodist Church was flooded by the rising Cullasaja and that portion of the community was cut off, although rescue squad members continued to enter and leave by boat.

In Franklin, property owners along the Little Tennessee had started casting wary eyes toward the river level under the bridge.

Only a few decided to take steps to protect merchandise inside their stores and businesses from flooding.

Starts Early

With obvious feminine intuition, as early as 10 o'clock Mrs. Blanche Brinkman, at Brinkman's Gem Shop in East Franklin, started putting things up off the floor. Quite a few teased her. Even her husband and close friends. They admit it now.

But, even Mrs. Brinkman's labors were in vain — she failed to put things high enough. The flood waters reached five feet inside the Brinkman shop. Showcases of cut stones and gems floated and then overturned dumping the contents into the mud and silt that collected inside.

"Trying to find those stones is like looking for that needle in a haystack," she commented Monday after the flood waters had receded.

"Who would have thought the water would get that high?" asked her husband.

Apparently few figured the water would even overshoot the banks at the bridge.

Road Cut Off

Shortly before noon, water creeping up in the swamp at the north end of the airport cut off US 84 at that point.

By 1 o'clock, cars and trucks were beginning to stall in the high water surrounding the Big Dollar parking area and the DeSoto Trail Restaurant. Boys rode bikes through the water.

At 2 o'clock, boats were helping rescue motorists stalled in the water. A state highway truck quit towing vehicles to high ground because the water was too deep.

The last car to be towed out of the rising water, a Ford, floated on the end of the tow chain at the East Franklin intersection.

By 2:15, everyone was ordered out of the bridge area. Water was tapping over the bridge approaches.

Short before 3 o'clock, WFSC reported receiving a telephone call from the owners of Smitty's Motel and Restaurant, on the Franklin side of the bridge. They wanted to be evacuated, the water was rising.

Owners Evacuated

An emergency boat operated by the Rev. W. Thomas Lane sallied forth from the East Franklin side (swift currents in the vicinity of the Winn-Dixie on the Franklin end ruled out rescue from this point) and reached the riverside motel. Water was at least two feet high in the motel office and rising rapidly. The Smiths were evacuated.

From this hour on, the Little Tennessee rose rapidly, almost covering the four-foot high abutments on the bridge by dusk.

A half-hundred or so spectators and property owners on the East Franklin side marked the advance of the

flood waters on an assortment of signs — then on the plate glass windows of the DeSoto Trail Restaurant, which resembled a huge fish bowl when furniture began floating inside.

Real estate man Clyde Sanders removed everything from his small building, then chained it to a light pole to keep it from floating downstream.

"You know all those liars who have been telling all those tall tales about the river?" he asked. "Well, I believe everyone of them."

Box Disappears

The mailbox near the Town Motel disappeared; then a huge concrete septic tank floating down the river smashed into the bridge; a propane gas tank floated by; and the telephone booth on the traffic island in front of the DeSoto Trail overturned and disappeared under the muddy water.

Lee's Amoco on the high side in East Franklin was the last business to close. Lee Poindexter gave up about 5 o'clock and volunteers helped him carry articles out of his station.

Between 7 and 7:30 the river crested, touching the top step at Dale Carter's Real Estate office (the old Reid building). Then it began the slow process of dropping. A detour, however, through Jolia on NC 28 via Sandertown Road, was closed. It was the only link between Franklin and East Franklin; a link of some 10 miles.

By midnight, the East Franklin side of US 23-441 was all but deserted. A lone highway employee stood watch.

Earlier, a TV crew from a Knoxville, Tenn., station appeared and conducted a brief interview.

The water was going down and everyone was happy.

"For people who are supposed to be in a disaster area, you people are the happiest I've seen," the TV reporter declared.

"Might as well be," someone answered out of the dark. "The damage's done."

It was a prophetic statement, even in jest.

The coming of dawn Monday showed the damage. As the river dropped inch by inch, so did spirits.

It was a mess.

A Long Night

And the long wait in darkness hadn't helped any — there were reports of gasoline leaks and the danger of fire; of a band of teenagers tossing firecrackers

into gasoline-coated water near the airport; and always the ominous rumor that a dam somewhere above was about to break.

Even before the water began receding, businessmen waded into their establishments and started the gargantuan task of cleaning up.

"I sure wish someone would pinch me and I'd wake up and find out all this is a bad dream," said one businessman, to no one in particular.

The entire flood disaster area was declared "off limits" to unauthorized persons by Police Chief C. D. Baird.

Radio pleas for volunteers to help merchants brought results. School children — on a "holiday" because of flood damage to rural roads — pitched in and worked. Within hours "Loganville" and East Franklin actually hummed with activity.

Spirits soared, it seemed, right in the face of impossible odds.

"You can tell 'em I'm coming back," declared Peak Line manager Howard Heathcock. "We're ruined, but we're going to be back in business."

Peak Line suffered the most damage of any business hit by the flood.

Still Working

And today (Thursday), they're still busy in the stricken area — and money will be for many days to come.

The damage was that extensive.

Some service stations are back in business.

Other places, like the Big Dollar, won't be back in business on any large scale for two weeks, possibly longer.

Most places, however, hope to be "trying to do business" by this week end.

This profound statement, uttered by a bystander on the East Franklin side at the height of the flood Sunday night, captures the feeling of all:

"If it hadn't rained, we wouldn't have had any trouble!"

Damage Estimates

Following is a breakdown of the damage estimates of most of the businesses hit by the flood:

Railway Express office: Small frame building between Franklin Tire and Appliance and C. S. Brown Esso. Disappeared down river.

Macon Bowling Center: \$10,000. Should be open in two weeks.

Brinkman's Gem Shop: \$15,000. Gem cutting mach-

inery, including 15 electric motors, total loss. Over half of cut stones in showcases that overturned during flooding lost in silt.

Ruby City: \$10,000. May just close down for the season and reopen next spring.

DeSoto Trail Restaurant: \$20,000. Hope to open by week end. Replacing most equipment and furniture.

Laundromat: \$5,000. Water rose 32 inches inside. Damage mostly to electric motors on machines.

Big Dollar Super Market: \$30,000. Opening again in two to three weeks.

Jacobs Gulf Service: \$1,000. Damage to electric motors and vending machines. Four feet of water inside.

Town Motel: \$40,000, including loss of business during period needed to make repairs.

Smitty's Restaurant and Motel: \$5-6,000.

Bennett Electric Service: \$25-30,000. Appliances a total loss.

Cunningham's Phillips 66: \$3-4,000.

Duncan Oil Company: \$10,000.

Franklin Concrete Products: \$1,500 to \$2,000.

R and E Cleaners and Indian Mound Speed Wash: \$7-8,000.

Indian Mound Station: \$3,000.

Nantahala Oil Company: \$20,000.

Frank's Auto Repairs: \$2,000. Nearly five feet of water inside.

Winn-Dixie: No estimate. Macon Parts and Equipment Company: No damage. Employees used predetermined "flood plan", utilized sandbags and other equipment to divert water from building. Worked "like dogs" getting merchandise on high shelves.

T. Hunter's Body Shop: \$2,000.

Gibson's Cabinet Shop: \$2,500.

R and W Motors: \$25-30,000.

Downs and Dowdle: \$10-12,000. Most damage in warehouse area back of store. Water reached four and a half feet inside.

Brown and Carson: No estimate.

Howard Stewart Construction Company: \$20,000.

Shook's Shell Service: \$800. Business on high side of Main Street, water only 24 inches deep in station.

Tom Hopkins Recapping: \$1,500.

City Cleaners: \$8,000. On low side of Main Street. Water reached six feet in boiler room.

Huscusson's Esso: \$15,000.

C. S. Brown Asso: \$10-12-000. Upright storage tank tipped dangerously by flood waters.

Franklin Tire and Appli-

ance Company: \$35-50,000. Tallent's Texaco: \$20,000. Peak Line Furniture: \$225-000.

Smoky Mountain Times, Bryson City, N. C.
October 8, 1964

Swain And Cherokee Counties Escape Serious Flood Damage

Swain and Cherokee counties were more fortunate than Buncombe and Macon Counties when it came to evaluating damage caused by flooded streams over the week end.

Heavy rain fell throughout Western North Carolina for several days, probably being part of the result of high water with an aftermath of mud.

damage in the states of Louisiana, Mississippi, and Florida.

The French Broad River overflowed its banks in Asheville, causing many people to evacuate their homes. A number of streets were closed to traffic Sunday night. Most of the damage was the result of high water with an aftermath of mud.

Macon County suffered more damage than any other county in this part of the state. Two small dams on the Little Tennessee River gave way to the pressure of flood waters which descended on the southern part of the Town of Franklin. Much damage was caused by the high water in much of the business section.

Farm lands in Macon also were damaged by the high waters of the Little Tennessee.

Streams in Swain County were full to the banks, and the Tuckasegee River overflowed in low places. For a time Sunday night, the river was in Highway 19, several miles east of Bryson City.

The river was reported as being not quite as high as it was

in the spring when heavy rain descended in this section. The Oconaluftee and Nantahala Rivers were filled with flood waters, but no serious damage was reported.

The Valley River in Cherokee County was at flood stage, as well as the Hiwassee, but the low level of the water in Hiwassee Dam took care of the situation.

Schools in Swain County were not in session Monday due to a foot bridge being temporarily used by children attending Whittier elementary school being washed away. They were in session, as usual, Tuesday.

Several deaths have been reported in Western North Carolina on account of flood waters.

The Highlander



Highlands, N. C., Friday, October 9, 1964

Macon Flood Damage Estimated As More Than \$1,000,000 Second Onslaught Of Rains Creates Damage And Anxiety

A second onslaught of heavy rains descended on Highlands, Macon County, and other parts of Western North Carolina last Saturday night and Sunday, striking before the area had fully recovered from the downpour of the previous Monday and Tuesday.

The worst flood in years in and around Franklin last week end caused Macon County to request to be designated a disaster area. Rivers on rampage brought floods to Transylvania, Jackson, Swain, Buncombe, and other Western North Carolina counties as well.

Rain began falling here about 7 p.m. Saturday night with not much more than sprinkles for the first two hours, then steadily increased to solid sheets of water that came down all through the night and continued without interruption until around noon Sunday, when it tapered off considerably.

Dr. Thelma Howell of the Highlands Biological Station reported that 10½ inches fell between 7 p.m. Saturday and 6 p.m. Sunday, with the greater portion of the fall occurring before Sunday noon. From 6 p.m. Sunday until the rain stopped entirely sometime Monday morning another .84 of an inch fell, bringing the total for the past 10-day period to 26.6 inches.

With such a tremendous amount of water falling on already water-soaked earth, very little was absorbed, and the water either pooled up temporarily or rushed headlong to the nearest stream, eventually swelling major streams to such proportions that dams of all local lakes were threatened. Two lakes known as the Brown lakes in the Flats area went out, and it was reported that a small summer home was carried by the onrush of swollen waters over the top of Mud Creek Falls.

The power lake dam (Sequoyah) managed to hold its own, though uneasy moments were experienced by many who watched the powerful rush of rising water that tumbled in Niagara-like cascades over the top of the dam. Floating timbers, rising from the surface in hopeless protest as they took the plunge over the dam, were piled up like match sticks or carried on downstream by the angry, swift-moving water.

Further up toward Highlands, Mirror Lake was overflowing its shore line and straining at a fairly new concrete dam which replaced the old wooden dam of former years.

There was grave speculation that if either Mirror Lake dam or the Country Club dam broke, the surge

of water would be too much for Sequoyah dam which was already under severe strain from the tons of extra water pressure.

Back in town, several homes had been evacuated because of water, and Forest Service trucks were removed from the workshop on Fifth Street when water became running-board deep.

Jimbo Potts, who had just settled his family back in his home after being "flooded out" Monday night, was driven out again early Sunday morning. Mrs. Mack Eviatt and daughter, who lived nearby, were also forced to evacuate, and water rose several inches in the home of Gilbert Beck. The Town cut Spruce Street in two in order to divert the heavy flow from the homes.

Much damage was done to a number of unpaved streets within the town limits, and Horse Cove residents were shut off from Highlands by road damage.

All in all, however, Highlands came through with minor damage when compared to near-by flood-ravaged Franklin that estimates its damage as well over a million dollars.

Wash Out Damages Water Main

Many Highlands residents were without water (at their faucets, that is) Sunday and Sunday night due to rain-caused damage to one of the Town's principal water mains.

The break in the water main occurred near the Kernan lake, and was evidently caused by a flow of water washing out supporting earth from under the heavy water line.

The Town crew worked from Sunday afternoon until 5 o'clock Monday morning to restore water supply.

APPENDIX F

PHOTOGRAPHS OF THE FLOOD

During and following the flood of October 4-5, 1964, photographs were made by newspaper photographers and by TVA photographers and engineers. Selected photographs from the considerable number of those collected are reproduced here as Figures 1 to 27. The photographs are grouped by the following three river basins:

- | | |
|---------------------------------------|-------------------|
| 1. Upper French Broad River Basin | Figures 1* to 17 |
| 2. Upper Little Tennessee River Basin | Figures 18 to 25 |
| 3. Upper Hiwassee River Basin | Figures 26 and 27 |

*Figure 1 is a scene of the September 29 flood; all others are of the October 4-5 flood.

Credits for the photographs are as follows:

Asheville Citizen-Times staff photographers Ewart Ball, Malcolm Gamble, and June Glenn, Jr., who took Figures 1, 6-8, 11-17, and upper scene of Figure 23.

J. P. Brady, Franklin, Figures 20-22.

Crisp Studio, lower scene of Figure 23.

Julian Hirt, Figure 24.

The Sylva Herald, Figure 25.

Joyce Henderson, Figure 26.

Tennessee Valley Authority, Figures 2-5, 9-10, 18-19, and 27.



Figure 1. ---The French Broad River invaded this area of brick houses and neighborhood church in Rosman on September 29. The high water mark can be seen on the bricks more than a foot above the current water level.



Figure 2. --The auto race track about 2 miles southeast of Brevard suffered the loss of embankment in several places on October 5. The track is on the right bank of the French Broad River, just upstream from the mouth of Nicholson Creek.



Figure 3.--A small dam holding a farm pond was washed out by excessive inflow. This is a half mile below Blantyre, just downstream from Blythe Mill Creek.



Figure 4. --- French Broad River about Mile 181, approximately 7 miles west of Hendersonville. The view is northeast and shows the flooding of Etowah Bridge, its left-bank approach, and Hebron Road at right.



Figure 5. --French Broad River at Horse Shoe, just below Johnson Bridge about Mile 173. The view is downstream.



Figure 6. --- The farm buildings at lower left are those shown at left in Figure 5. This view from a higher altitude shows the French Broad River between Miles 173 and 169. The channel is between the two rows of trees. Shaw Creek enters from the right just below bottom of picture; Boylston Creek enters from left at upper center and the Mills River enters from left near the top of the view.



Figure 7.--Main Street in Hendersonville was flooded by Mud Creek on October 4. This view is south at the intersection of U. S. Highway 176 with Main Street, which is U. S. Highway 25. The creek is behind the camera, flowing from right to left.



Figure 8. --Mud Creek is crossed by Chimney Rock Road, U. S. Highway 64, just outside the Hendersonville city limits. The view is northeast, away from town, showing the overflow from right to left in the vicinity of the bridge.



Figure 9. --This view of Mud Creek is northwest at Mountain Home, 4 miles downstream from Hendersonville. A fill washout on the Southern Railway shows at lower left.



Figure 10. --French Broad River at 2:20 p.m. October 5, viewed southeast or upstream from Fanning Bridge toward the mouth of Cane Creek about 9 miles northwest of Hendersonville. The bridge is in extreme foreground, and a new span under construction is just above it.



Figure 11. --A sand and gravel operation is flooded between the left bank of the French Broad River and the left bank of Hominy Creek, which joins the main stream just out of the picture at lower right. In the background is part of the Biltmore estate.



Figure 12. -- This auto race track lies between the left bank of the French Broad River and Amboy Road, which is submerged along left limit of flooded area. The view is at Mile 150, a mile upstream from the mouth of the Swannanoa River.



Figure 13. -- Brook Street above Biltmore Avenue, on the left side of the Swannanoa River and close to the left bank of Sweeten Creek, was flooded by creek discharge on October 4.

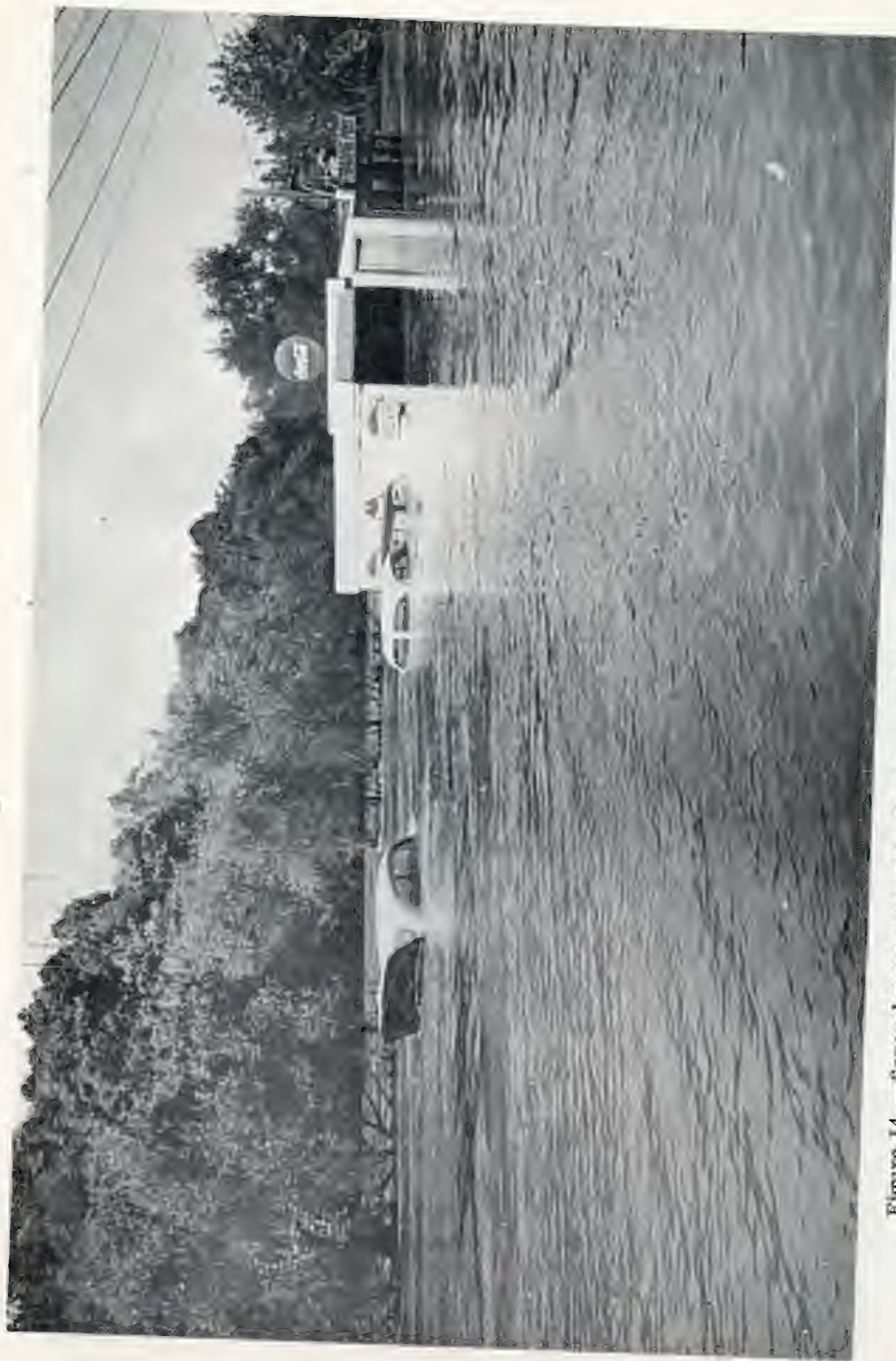


Figure 14. --Several cars were virtually submerged alongside the Trading Post, on Lyman Street close to the right bank of the French Broad River at Mile 147.9.



Figure 15. --Typical of Asheville waterfront scenes on October 5 was this view north from the corner of Lyman Street near Riverside Drive. The West Asheville Viaduct can be seen through the trees.

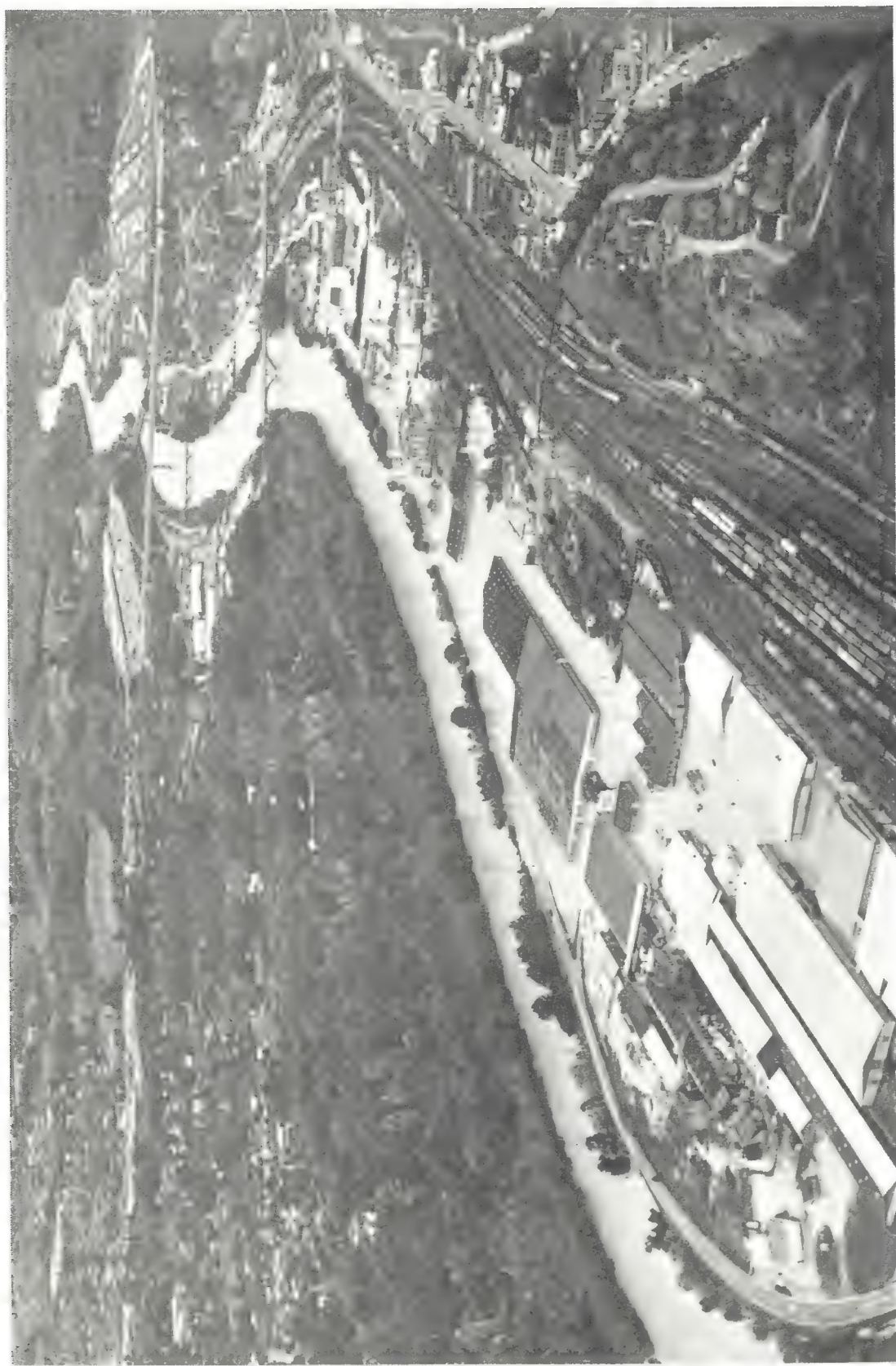


Figure 16. ---The Asheville waterfront on October 5 presented this scene of flooded warehouses, stockyards, and numerous other industries between the French Broad River and the Southern Railway. In the background are the West Asheville Viaduct, the Smith Bridge, the high Smoky Park Bridge, and the railway bridge.



Figure 17. ---The Marshall High School, on Blennerhassett Island in the French Broad River, was surrounded on October 5, and part of the building was flooded.



Figure 18. --The Little Tennessee River upstream from Franklin reached the bottom of windows at Peak Line Manufacturing, Inc., as shown by the silt line. The view is northwest, and the main channel is just out of the view at foreground, flowing from left to right.



Figure 19. ---The Gaylord Reid home, on the bank of the Cullasaja River above the stream gage at the village of Cullasaja, was lifted off its foundations October 4 and turned 90 degrees. This view taken four days later shows salvage and dry-out operations. Note the twigs and grass on porch roof.



Figure 20.--The Cullasaja River bridge on U. S. Highway 64 at Cullasaja caught the remnants of the Stewart house and other debris. Workers are shown on October 5 attempting to clear the waterway and relieve pressure against the structure.



Figure 21. --East Main Street in Franklin was a sea of mud on the afternoon of October 5. The view is south toward the intersection of Depot Street, and away from the Little Tennessee River bridge.



Figure 22.--Sections of the asphalt pavement of this supermarket parking area in Franklin were washed away like scatter rugs. Water-soaked foodstuffs from the lower shelves are shown in front of the store on October 5, waiting to be hauled away.



Figure 23.--These views of East Main Street in Franklin were taken during the October 4 flood. Upper view is southwest toward the Little Tennessee River bridge from the right bank and shows men standing thigh-deep at real estate office. Lower view is east toward the river from several hundred feet up the hill on the opposite side.



Figure 24. -- The Tuckasegee River washed out a bridge on Wayehutta Road above Cullowhee. The picture was taken October 5.

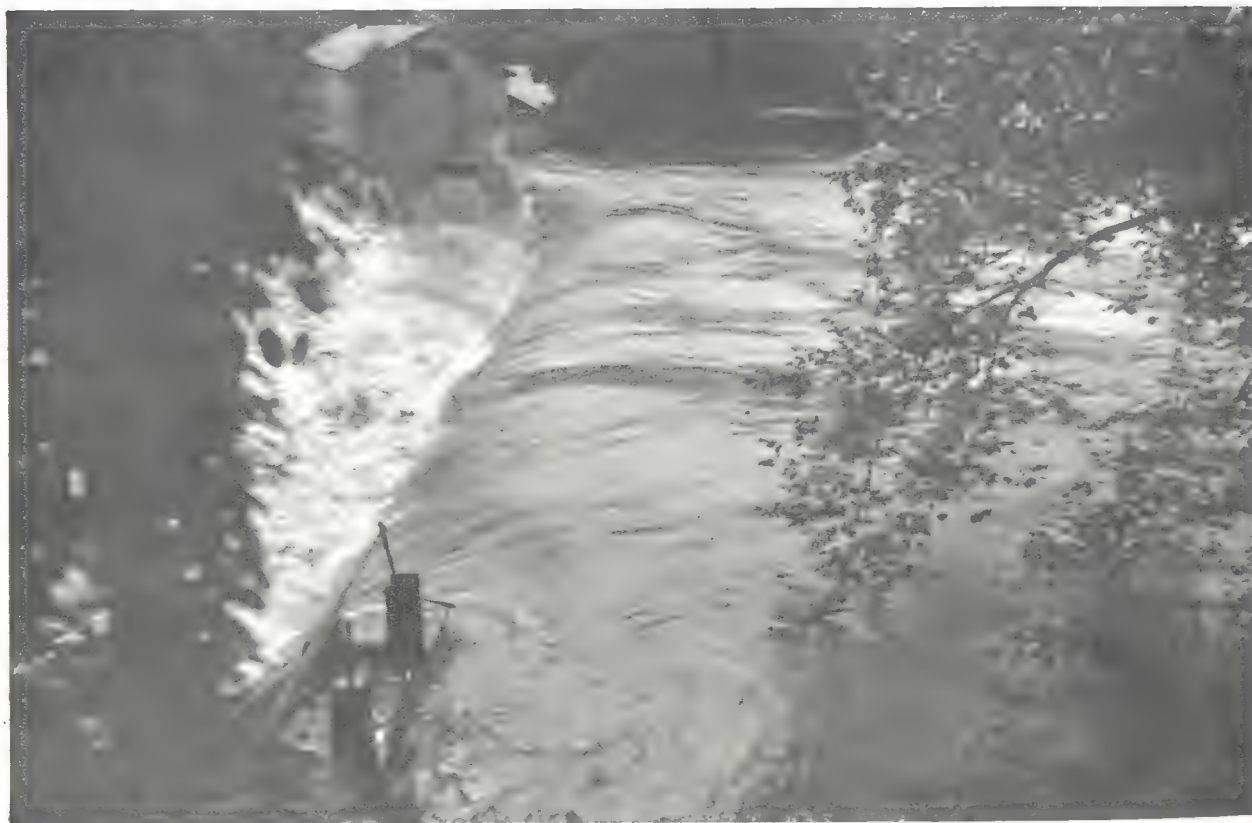


Figure 25. -- Excessive flow through the powerhouse at the Dillsboro dam on the Tuckasegee River is shown in this view taken October 4.



Figure 26.--Flooded cornfield on left bank of Brasstown Creek just below Georgia Highway 66 at Welch. The house is surrounded by water.



Figure 27.--This private bridge just upstream from Ogden School on Brasstown Creek was destroyed by the October 4 flood. A temporary footlog had been placed by October 16. The location is in Clay County, North Carolina.





APACK

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FLOODS OF SEPTEMBER-OCTOBER 1964 IN THE UPPER FRENCH BROAD
LITTLE TENNESSEE AND HIWASSEE RIVER BASINS

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